The RUBBER AGE

January, 1946

THREE WINNERS

KALVAN

for non-black compounds

BONDOGEN

for plasticizing Rubber, Reclaim and Synthetics

CUMATE

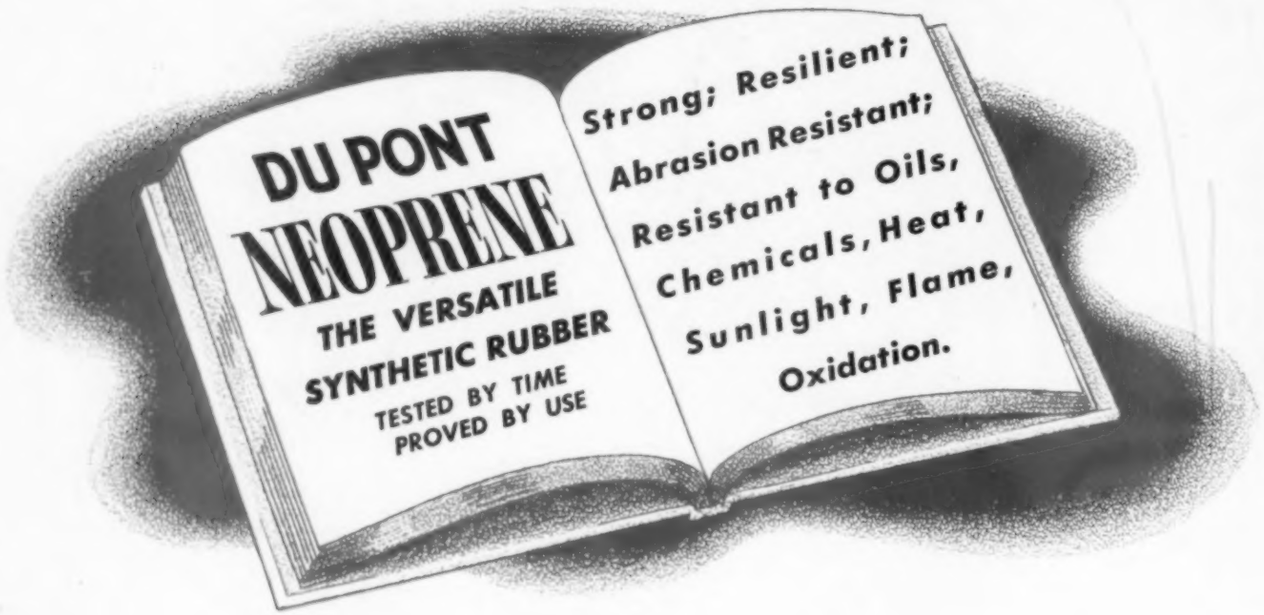
for fastest curing, safe processing GR-S stocks

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City

Newsletter No. 1
JANUARY, 1946

Published by Rubber Chemicals Division of DU PONT



NEOPRENE TYPES AVAILABLE...

NEOPRENE TYPE CG — Primarily for quick-setting, high bond strength adhesives. Provides greater stiffness in uncured stocks.

NEOPRENE TYPE E—Limited use for specialties. Does not soften progressively with prolonged milling.

NEOPRENE TYPE FR—Freeze resistant. For low temperature service and maximum resilience.

NEOPRENE TYPE KNR — For troweling putties and paints used in tank linings and protective surface coatings. For preparing easily processed, highly loaded stocks.

NEOPRENE LATEX TYPE 571—Approximately 50% of solids. All-purpose latex for general use.

NEOPRENE LATEX TYPE 571 CONCENTRATE—Approximately 59% solids. For general use where high solids are required. Minimum of odor.

NEOPRENE LATEX TYPE 572 — Approximately 50% solids. A fast-setting, high wet strength latex for adhesives.

NEOPRENE LATEX TYPE 60 — Approximately 59% solids. A high solid latex for special applications. Especially suited for froth sponge and dipped goods.

NEOPRENE GRM and GRM-10 — General purpose neoprenes supplied only by Rubber Reserve Company, Louisville, Ky. Purchase permits required.

Let Du Pont Service help you with your problems. Write or call:

E. I. du Pont de Nemours & Co. (Inc.),
Rubber Chemicals Division, Wilmington 98, Del.

BUY AND HOLD VICTORY BONDS

DU PONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. January, 1946. Vol. 58, No. 4.

RY
FEB 9 1946

HYCAR ad boosts selected combinations of properties

Tells your prospects HYCAR can be compounded to meet specific service requirements

THE current HYCAR advertisement appearing in a long list of business and trade publications describes an application in the aviation industry. HYCAR was selected for the application because it was known in advance that the properties needed to meet predetermined service conditions could be obtained in exactly the right combination. It was only a matter of proper compounding.

This is the kind of story that encourages men in all industry to ask for parts made from HYCAR—and it should encourage you and your sales staff in your efforts to sell profitable *quality* products instead of low-margin competitive ones.

We provide *you* with 3 helps that make it easier for *you* to sell parts made from this *superior* material:

. . . High quality special purpose synthetic rubbers
. . . Technical aid in compounding problems
. . . A strong national advertising program directed to *your* prospects.

For more information about HYCAR synthetic rubber, or for help with your problems, please write Dept. HD-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar

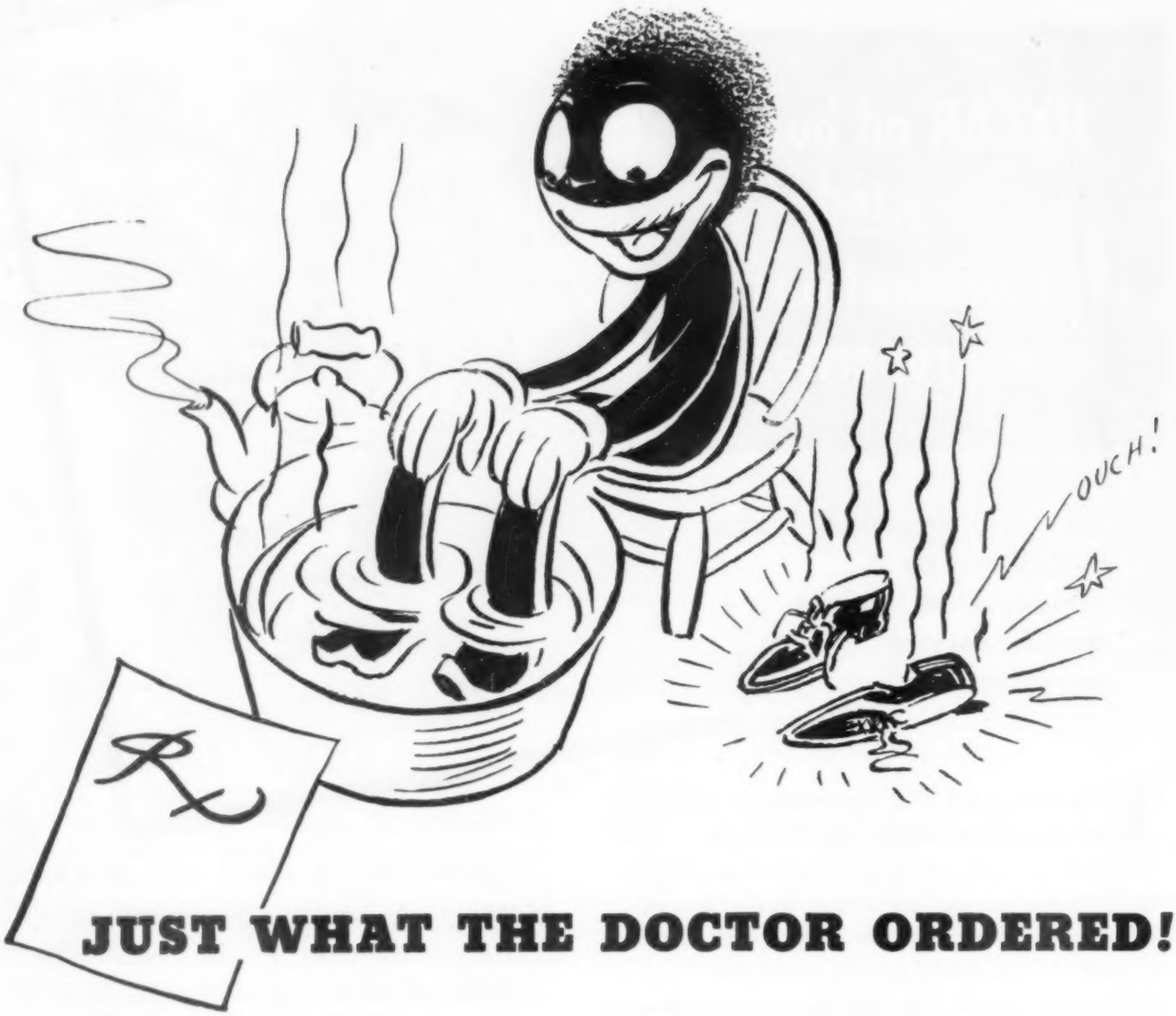
Reg. U.S. Pat. Off.

LARGEST PRIVATELY PRODUCED BUTADIENE TYPE

Synthetic Rubber

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY



JUST WHAT THE DOCTOR ORDERED!

Home remedy? Not a bit of it! Philblack A is a modern, highly scientific "prescription" used successfully by many makers of tires, tubes, and other rubber goods. It removes the nerve from rubber easily . . . and with the least possible pain to the rubber manufacturer!

While Philblack A is no panacea, it cures or alleviates many of the other ills that synthetic rubber is heir to. As follows:

Symptoms and Treatment

Use Philblack A to lower heat build-up . . . to aid easier and faster processing . . . to increase resistance to abrasion . . . to build up better immunity to cut and crack growth . . . and for better-looking finished products!

PHILLIPS PETROLEUM COMPANY

Philblack Division

FIRST CENTRAL TOWER BUILDING · AKRON, OHIO

Shoe parts made from Geon . . . suggest many other interesting applications

New material adds permanent beauty —lengthens shoe life

THOSE strips of shoe trim material in the picture look ordinary enough—but actually they're revolutionary. For GEON polyvinyl materials have made possible completely new techniques in shoe styling and manufacture. The GEONS are thermoplastic raw materials that can be extruded (as these strips were), pressure or injection molded, cast or calendered into sheet or film, or used as coatings for fabric and paper.

As a shoe material GEON can be used for trim, soles, heels, welts and ribs, toe caps and liners. These and other products made from GEON can be brilliantly or delicately colored. They can be given a smooth or embossed surface, a dull or mirror finish. They won't crack or check because they are so highly resistant to aging. They are easy to clean because dirt and water —even corrosive acids—can't penetrate the surface.

All these and many more unusual properties can be considered in connection with a wide variety of products other than shoes: scuffproof, good-looking, practically indestructible luggage and brief cases; upholstery material that can be left outdoors because it resists the aging effects of weather; water and mildewproof fabric coatings for rainwear, shower curtains, tents; film, sheet, or coatings of GEON for packages that will resist wear, aging, chemicals, foods, tobacco, oils and greases, moisture, heat and cold.

There are applications for GEON in every phase of American life. For more complete information write Dept. K-1, B. F. Goodrich Chemical Company, 324 Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

Yes....

Philadelphia Reclaim

is Good!

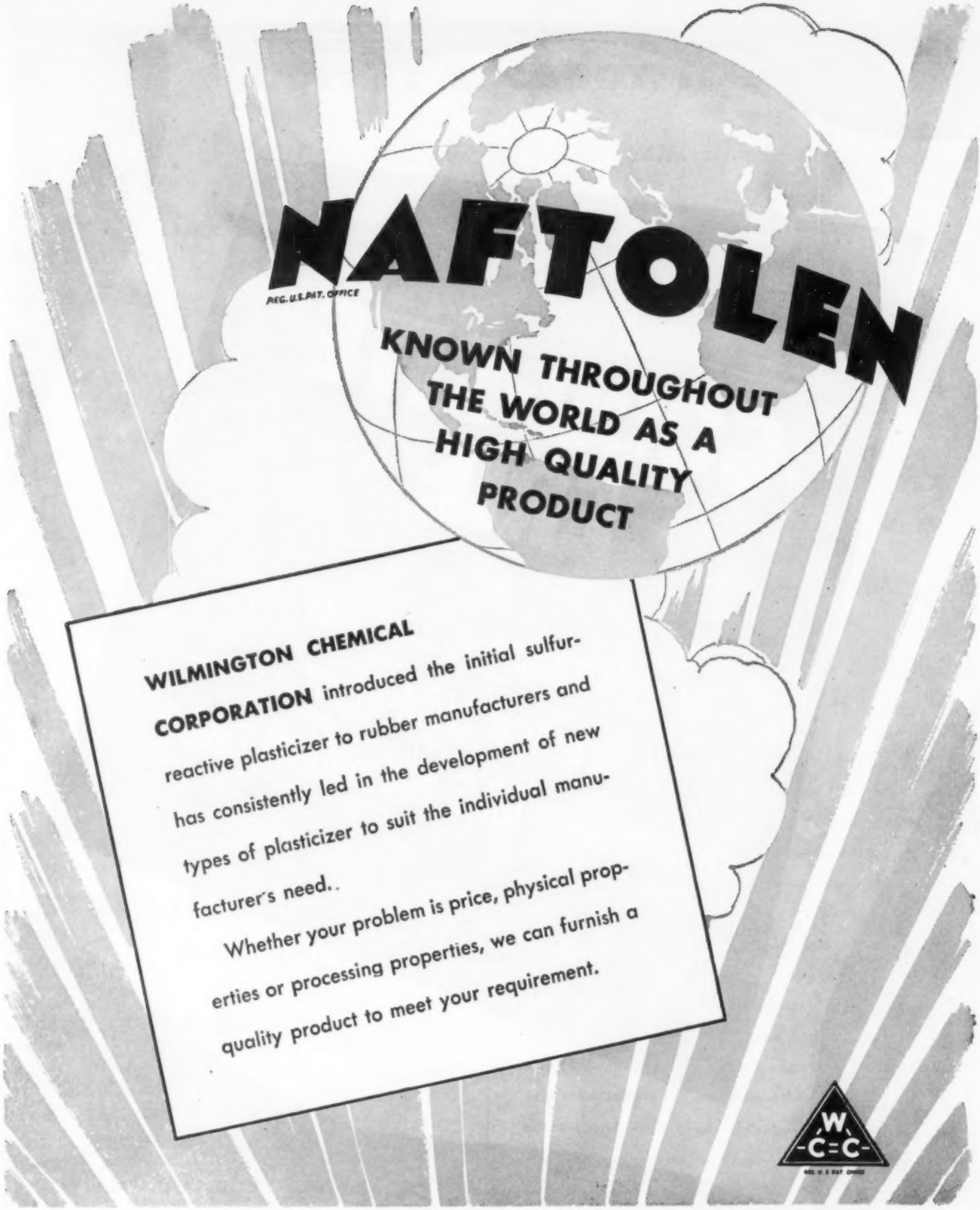
★ For some months in these pages we've been saying that Philadelphia reclaim has an important place in American industry—because for many purposes it is the most economical compounding material that can be found; stable and dependable; compatible with natural and synthetic rubbers.

Industry in general must agree with our statements — for right now *there just isn't enough Philadelphia reclaimed rubber to meet the enormous demand.*

Our apologies won't do you any good. So instead of apologizing we'll pledge ourselves to produce every pound of Philadelphia reclaim that it's in our power to produce—and fast.

Peak demand should be reached soon, and that will give us a chance to catch up. So please be patient. And don't forget what you already have learned—that Philadelphia reclaim is *good.* The Philadelphia Rubber Works Company, Dept. BB-1, Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER


NAFTOLEN
REG. U.S. PAT. OFFICE
KNOWN THROUGHOUT THE WORLD AS A HIGH QUALITY PRODUCT
WILMINGTON CHEMICAL CORPORATION introduced the initial sulfur-reactive plasticizer to rubber manufacturers and has consistently led in the development of new types of plasticizer to suit the individual manufacturer's need..
Whether your problem is price, physical properties or processing properties, we can furnish a quality product to meet your requirement.
W
C=C

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

For technical data please write Dept. RB-1

B. F. Goodrich Chemical Company

A DIVISION OF
THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

GODFREY L. CABOT, INC.

announces the appointment of

RAW MATERIALS COMPANY

NEW YORK (17)—220 E. 42nd STREET
BOSTON (10)—77 FRANKLIN STREET

as selling agent in

Metropolitan New York and New England

CABOT

FOR RUBBER

SPHERON
Channel Blacks

STERLING
Furnace Blacks

PINE TAR

GODFREY L. CABOT, INC.
77 FRANKLIN STREET
BOSTON 10, MASS.

FOR SERVICE

AKRON—Godfrey L. Cabot, Inc.—Hemlock 2169
BOSTON—Raw Materials Company—Liberty 1284
NEW YORK—Raw Materials Company—Vanderbilt 6-5510
TRENTON—H. N. Richards Company—Trenton 3-4186
BUFFALO—Commercial Chemicals, Inc.—Cleveland 1190
CINCINNATI—Carl Cramer Company—Cherry 7174
PITTSBURGH—Homer D. Butts—Atlantic 7680
CLEVELAND—J. H. Hinz Company—Cherry 0074
DETROIT—M. R. Matteson—Madison 8137
CHICAGO—Procter & Johnson—Superior 4797
ST. LOUIS—Homer G. Allen & Company—Parkview 3410
SAN FRANCISCO—Pitts & Loughlin—Sutter 5582
LOS ANGELES—B. E. Dougherty Company—Michigan 9511
PORTLAND—Van Waters and Rogers, Inc.—Seneca 2100
SEATTLE—Van Waters and Rogers, Inc.—Trinity 1167
CANADA—Harrisons & Crosfield (Canada) Ltd.
Toronto—Adelaide 6031
Montreal—Market 7386

Essential!

GLYCERIZED

(LIQUID CONCENTRATE)

LUBRICANT

Yes GLYCERIZED *has proved to be an essential agent in modern day rubber processing!* . . . . . .

GLYCERIZED eliminates unhealthful and annoying 'dust' arising from the use of soapstone, talc, etc. Merely by dipping the slabs as they are cut from the mixing mill into a GLYCERIZED solution, all stickiness is done away with. Complete separation of piled stocks is assured. Adhesion is abolished! The cost is but a fraction of the former, old dusty method.

GLYCERIZED solution prevents sticking during cure of extrusions and tubing, when coiled on the flat pan or continuous running. Lubrication of molds, mandrels, air bags, belt drums, insulated wire and cable, etc. are all vastly facilitated by applications of GLYCERIZED solution.

Inner tubes, automotive parts and other molded and extruded goods are washed and finished readily with GLYCERIZED solution. It cleans thoroughly and lends that glossy, satiny finish so desirable in rubber products. Specific directions and proportions are furnished with each shipment.

GLYCERIZED is truly a versatile lubricant adapted to all types of synthetic rubbers as well as to natural rubber, reclaim or mixture thereof. During war and peace, GLYCERIZED LUBRICANT has served faithfully throughout the entire rubber industry. Many rubber concerns who won the Award for Excellence in War Production received consistent support in supplies of GLYCERIZED LUBRICANT which were at all times unfaltering.

GET THE GENUINE *from* GENSEKE

Yes GLYCERIZED *has well earned its place as the established lubricant in rubber processing* . . .

AVAILABLE IN DRUMS, HALF DRUMS AND QUARTER DRUMS

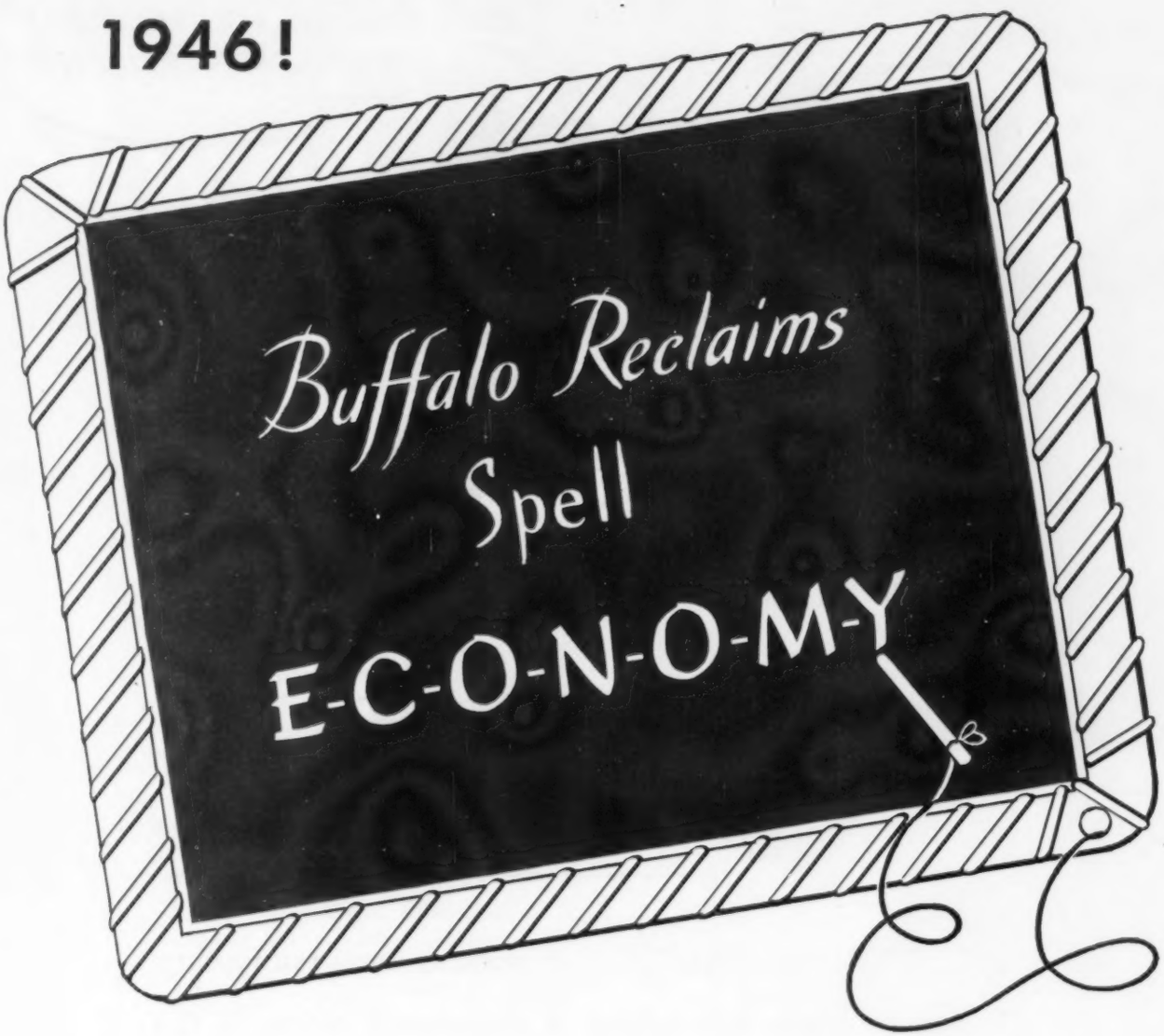
QUALITY SINCE 1884

GENSEKE BROTHERS

RUBBER MATERIALS DIVISION

West 48th Place and Whipple Street — Chicago 32, U.S.A.

Lesson for 1946!



With competitive days looming ahead, economy—without sacrifice of quality—is once again of paramount importance. And to many manufacturers of finished rubber products, Buffalo Reclaim is synonymous with speed and economy in compounding and processing.

BUFFALO has *earned* its reputation by subjecting ALL its reclaims to rigid laboratory control . . . to make certain you consistently get high-quality uniform grades.

If you have any problems concerning reclaimed rubber, write us. Our experience covers a span of over 63 years—so there is more than an even chance we can help you.

U. S. RUBBER RECLAIMING COMPANY, INC.

500 FIFTH AVENUE • NEW YORK 18, N. Y. • (Plant at Buffalo, N. Y.)

TRENTON . . . H. M. ROYAL, Inc., 689 Pennington Avenue • TORONTO . . . H. VAN DER LINDE, Ltd., 156 Yonge Street

63 Years Serving the Industry Solely as Reclaimers

PELLETEX and GASTEX, the leading semi-reinforcing furnace blacks are taking a prominent place in the reconversion picture.

Send for technical bulletins mentioning the application in which you are interested.

MANUFACTURER • DISTRIBUTOR

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

PAMPA, TEXAS · GUYMON, OKLA.

HERRON BROS. and MEYER

NEW YORK, N.Y. AKRON, OHIO

RUBBER H AND M PIGMENTS Chemicals

NO PLASTICIZERS NEEDED

with this

NEW OIL RESISTANT BUTAPRENE N

THIS new Butaprene elastomer is a compounder's dream — a synthetic rubber, highly resistant to ALL types of oils and solvents, yet one that extrudes with satin smoothness, processes and molds beautifully. *And all without plasticizers of any kind.*

The perfection of Butaprene Type NAA is further evidence of Firestone leadership in the vital new synthetic rubber industry. Outstanding possible uses for this latest member of the Butaprene family are:

Production of rubber tubing, stoppers, closures, seals and molded rubber parts used in packaging liquid foods and drugs, where extraction of plasticizer affects purity, flavor or palatability.

Compounding of rubber products where plasticizer extraction results in leakage, or otherwise interferes with mechanical serviceability.

For complete information regarding Butaprene NAA simply write XYLOS RUBBER COMPANY, DISTRIBUTORS, AKRON 1, OHIO.

BASIC FORMULA

Butaprene NAA	100	Sulfur	1.25
M. T. Black	100	Benzothiazyl Disulfide	1.25
Zinc Oxide	5	Tetramethyl Thiuram Disulfide	0.50
Stearic Acid	1	Total ingredients	209.00

Physical Properties—Slab Cure 10' x 312° F.

Tensile psi	1380
Elongation %	450
Durometer A	68

BUTAPRENE N

by Firestone

THE SYNTHETIC RUBBER OF A THOUSAND USES

Resists: OIL • GASOLINE • HEAT • SUB-ZERO COLD • AGING • ABRASION

Listen to the Voice of Firestone every Monday evening over NBC.

Technical Bulletin No. 17 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

Improvement in Physical Properties by Banbury Masterbatching Zinc Oxide in GR-S

With XX Red-166 it is possible to make 90:10 Zinc Oxide : GR-S Masterbatches which are surprisingly plastic after standing several days. This is best accomplished in a two-step operation. First make a 70:30 Masterbatch, and then increase the pigment concentration to 90:10.

On dilution to 100 Zinc Oxide : 100 GR-S the Masterbatches show an improvement in physical properties of the same order as shown in the Latex Masterbatches where a dispersion of Zinc Oxide in water is added to GR-S Latex and then coagulated.

Results are shown for the immediate dilution of the Masterbatch, and after standing overnight. Somewhat better tensile values are obtained in the latter case. The Masterbatched stocks are somewhat slower curing than the direct mixed compound.

COMPOUND 17

GR-S	100.0
Sulfur	3.5
MBT	2.0
ELC Magnesia	5.0
Coumarone-Indene Resin	7.5
XX Red-166 Zinc Oxide	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
DIRECT MIXING—LABORATORY MILL										
7.5	1670	905	155	235	310	425	.39	39	80	37
15	1530	685	235	315	470	705	.28	45	62	36
30	1490	595	235	390	550	825	.27	48	59	35
45	1450	570	275	390	625	980	.26	48	66	35
60	1580	575	270	425	655	960	.26	49	58	34
90	1255	540	315	430	665	1020	.19	49	62	35
90:10 MASTERBATCH—DILUTED WHILE HOT										
7.5	1480	1075	120	160	200	240	.42	36	91	32
15	1920	830	200	240	320	440	.33	42	65	34
30	1860	715	240	275	395	595	.31	45	61	34
45	1600	630	240	320	440	720	.27	46	62	33
60	1480	645	240	320	440	680	.25	47	58	34
90	1520	630	240	320	440	640	.23	48	58	34
90:10 MASTERBATCH—DILUTED AFTER STANDING OVERNIGHT										
7.5	1200	1080	80	115	155	195	.44	35	92	33
15	1900	890	120	160	240	320	.43	41	61	32
30	1980	740	160	240	320	485	.33	45	58	33
45	1735	690	200	285	360	565	.29	45	61	35
60	1980	700	200	285	320	525	.32	47	58	35
90	1550	650	205	285	365	570	.26	47	64	35

Uniform Quality HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO

PREPARED AS A PRESCRIPTION

LOTOL

REG. U.S. PAT. OFF.

Compounded Latex

for

★ Dipping ★ Coating ★ Saturating ★ Bonding

NAUGATUCK CHEMICAL

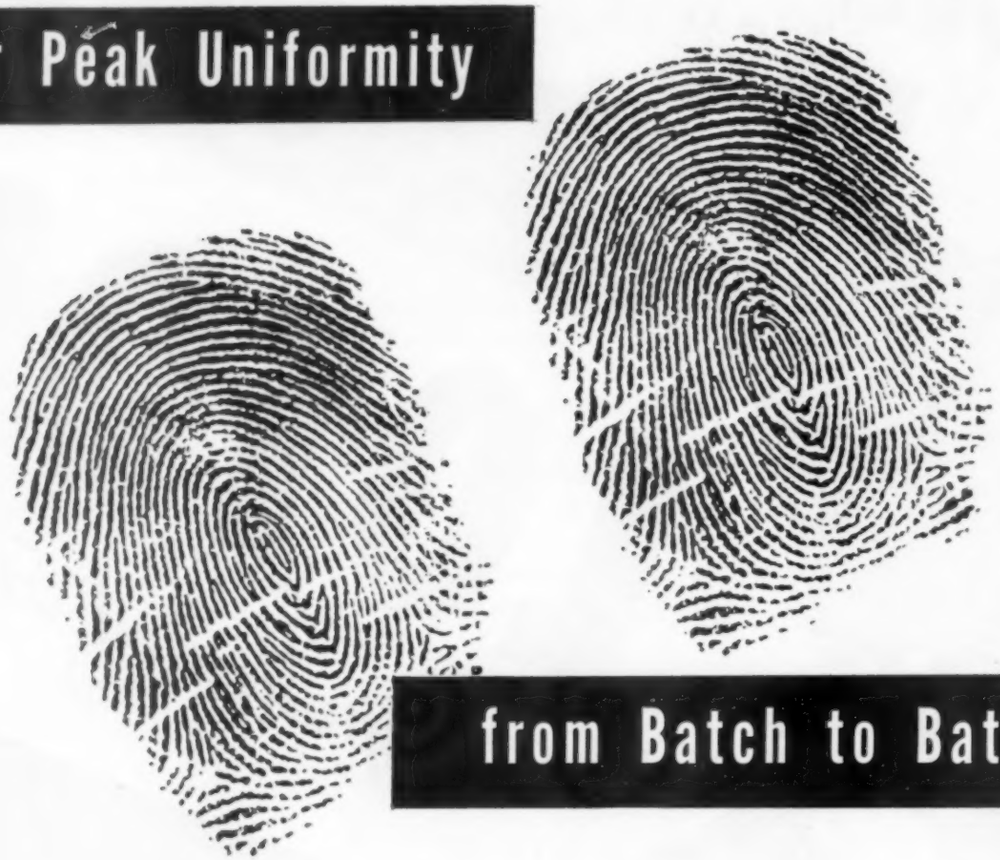
Division of United States Rubber Company

1230 AVENUE OF THE AMERICAS • NEW YORK 20, N.Y. BRANCHES: AKRON · BOSTON · DETROIT · NAUGATUCK

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

For Peak Uniformity



from Batch to Batch

RCI DIBUTYL PHTHALATE

For uniformity of end products you need uniform ingredients—and that's exactly what you get when you utilize RCI Dibutyl Phthalate for plasticizing Vinyl, Neoprene and Buna N synthetic rubbers. *Its quality is constant because RCI's system of production control tolerates nothing less.* Write to the Sales Department for further data on this thoroughly dependable controlled-quality plasticizer.

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants:

Brooklyn, New York • Elisabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Paris, France • Sydney, Australia

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

We have been through trying times. Many problems of reconversion are still ahead.

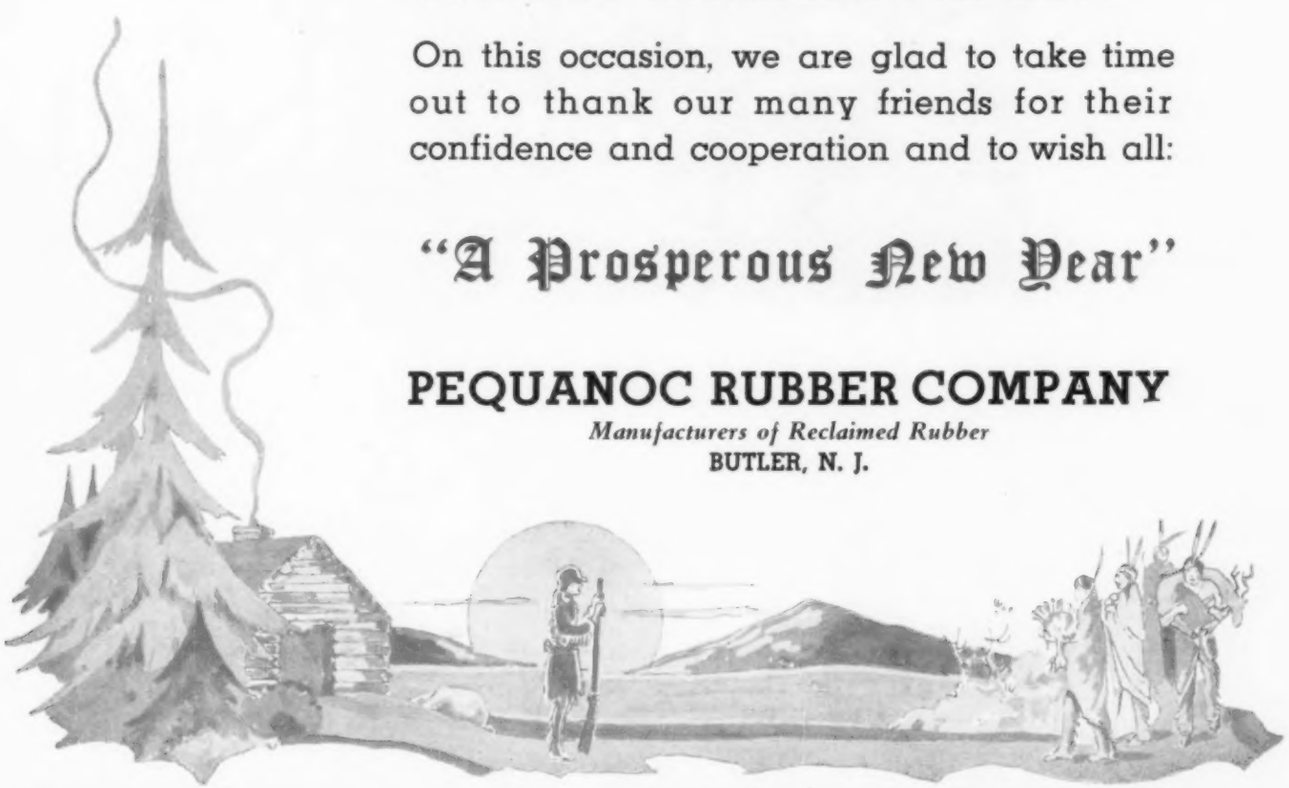
On this occasion, we are glad to take time out to thank our many friends for their confidence and cooperation and to wish all:

"A Prosperous New Year"

PEQUANOC RUBBER COMPANY

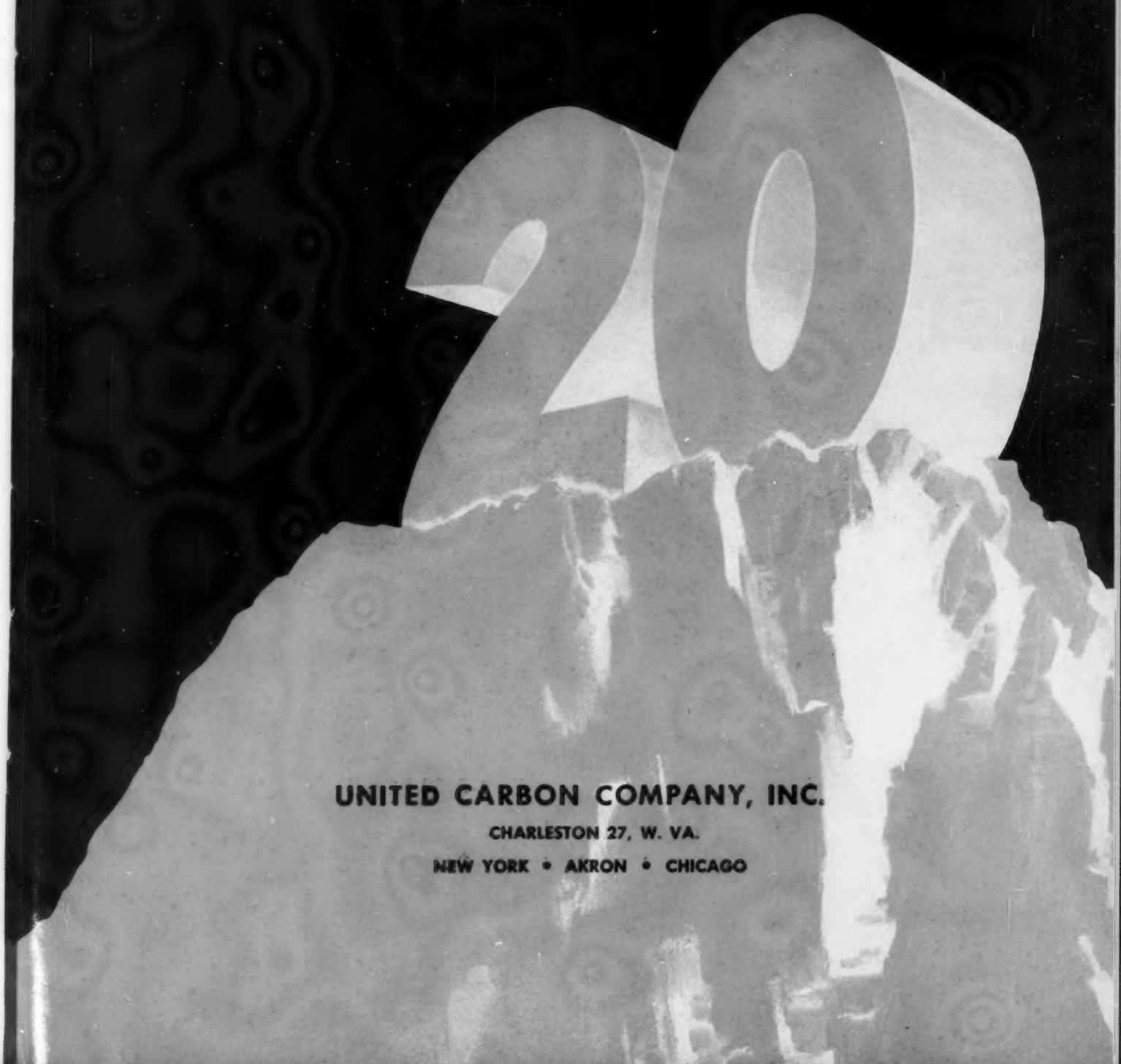
Manufacturers of Reclaimed Rubber

BUTLER, N. J.



Your RED CROSS
must carry on!
Give

KOSMOS DIXIE



UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

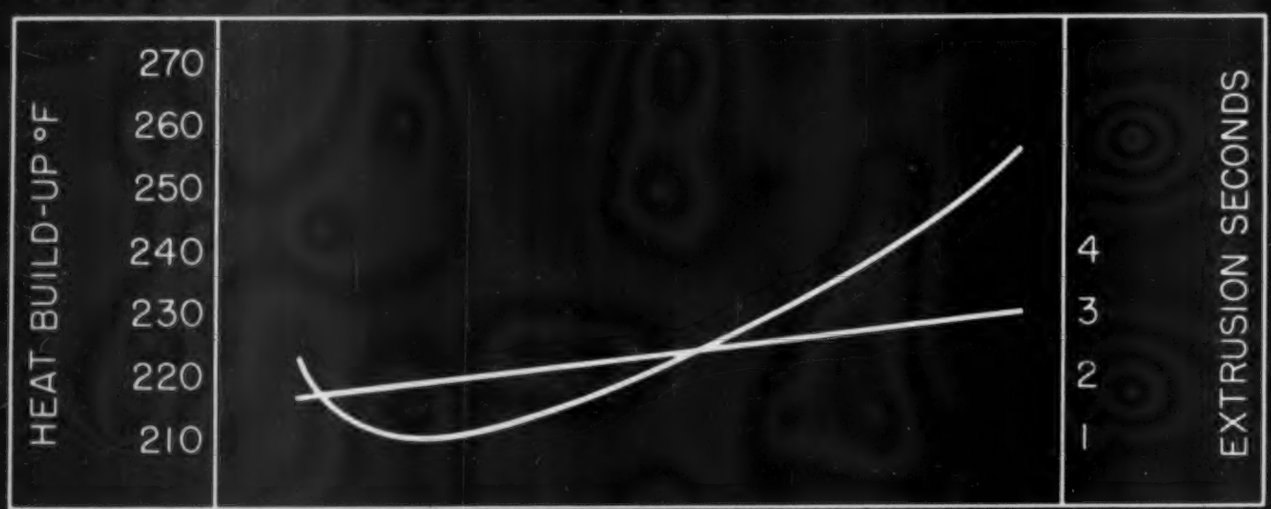
NEW YORK • AKRON • CHICAGO

KOSMOS 20 · DIXIE 20

SRF TYPE

SEMI-REINFORCING FURNACE DUSTLESS BLACK

LOADINGS 0 10 20 30 40 50 60 70 80 90 100

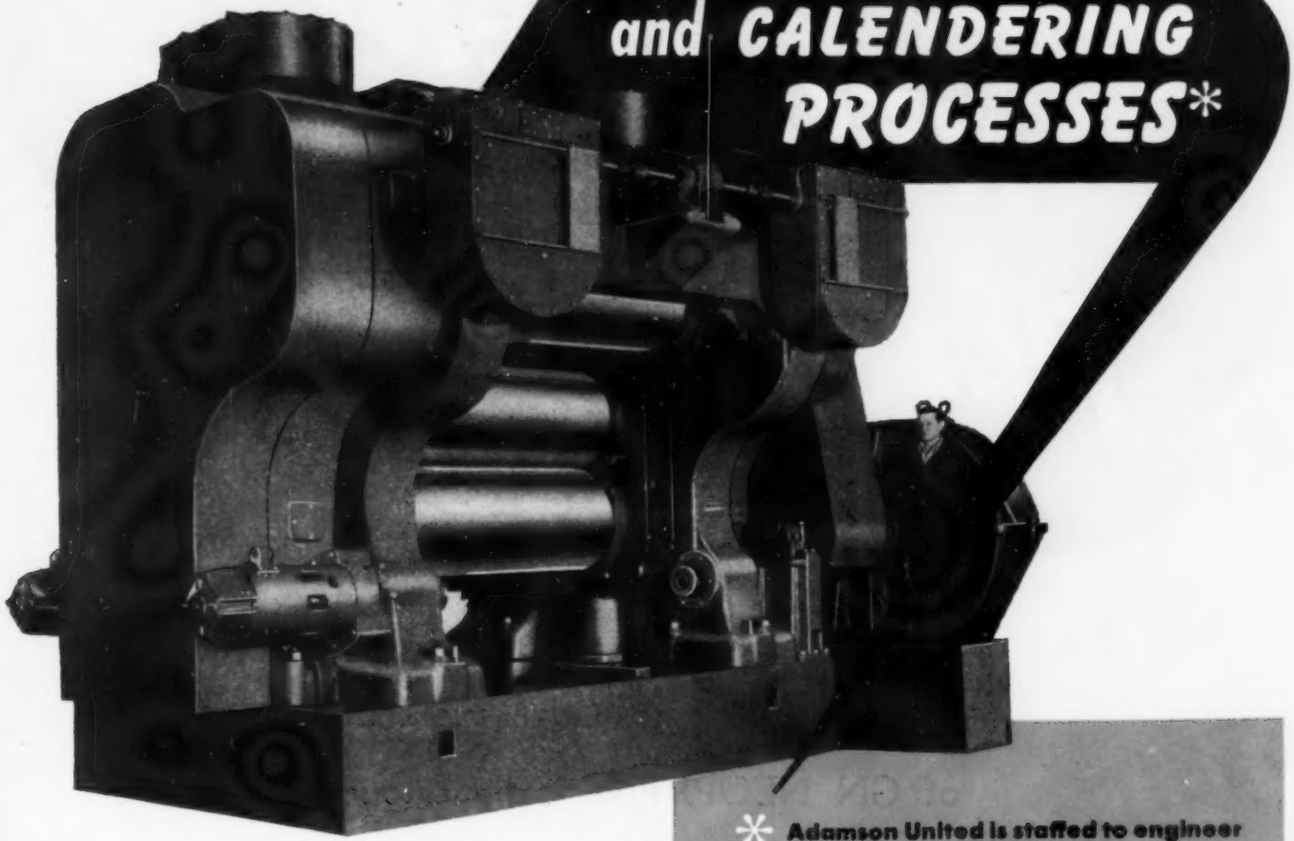


RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

ADAMSON UNITED CALENDERS and CALENDERING PROCESSES*



Adamson United Calenders are expressly designed for extremely close tolerance in the production of plastic film, or for the coating of fabric with rubber or plastic. Among their many features are:

- Extra heavy housings and totally enclosed piping with all exposed surfaces smooth for easy cleaning.
- Precision roll adjustment mechanism, with slack take-up, arranged for use with automatic gauging equipment.
- Adamson bearing design for high temperature operation with ample flow of filtered lubricant around the roll journals. Original anti-leak design of oil seals retains lubricant in bearings. Conditioning of lubricant insures uniform oil film thickness.
- Roll diameter and lengths are selected for each particular job. Various roll combinations are available.

Write for complete technical data, or consult our engineers concerning special rubber or plastics machinery or processes.

* **Adamson United is staffed to engineer and furnish complete calendering process systems for either Rubber or Plastics, including all accessory equipment, such as**

FABRIC DRYING
EXPANDER ROLLS
GUIDING DEVICES
ORIENTING ROLLS
COOLING ROLLS
STORAGE FESTOONS
WIND-UP AND LET-OFF STANDS

with associated coordinated drives.

ADAMSON UNITED COMPANY akron ohio

DISTRICT SALES OFFICES:
C. H. Armstrong, Manager, Bloomfield Bank & Trust Building, Bloomfield, N. J. Telephone: Bloomfield 2-4143
C. M. Baldwin, Manager, 140 South Clarke Street, Chicago 3, Illinois, Telephone: Central 1353

Subsidiary of **UNITED ENGINEERING AND FOUNDRY COMPANY**

Plants at PITTSBURGH · VANDERGRIFT · NEW CASTLE · YOUNGSTOWN · CANTON

If you add to the native excellence of GN NEOPRENE a light touch of NEOPRENE PEPTIZER P-12, the result—from a processing and stability viewpoint—will be astonishing.

Write us for Technical Information. Or, better yet ask anyone who is using it!

•

THE CALDWELL COMPANY

2412 First Central Tower

Akron 8, Ohio

Trade Mark Registered *Patent Applied For*

hammering home the superiority of RAYON CORD TIRES

HERE's a striking ad, in full color, hitting 17,294,279 more American motorists right between the eyes.

IN

Saturday Evening Post
Fortune
Look
American Magazine
Liberty
American Weekly

Its message: to tell America about Rayon Cord Tires—how they proved themselves in war and will soon be rolling the roads of peace—how they will run cooler, give longer mileage, with fewer blowouts and road failures. Now's the time to learn all you can about rayon's advantages in tires. Our booklet "Rolling on Rayon" tells the complete story. Send for it today; it's FREE.

TYRON* rayon for tires

Made by INDUSTRIAL RAYON CORPORATION
Cleveland, Ohio

*Reg. U. S. Pat. Off.

THIS SYMBOL

BRONZE BY PAUL MANSHIP

Hercules helps with broad range of materials

You are probably familiar with this symbol—where some individual Hercules product such as Solvenol*, Dipentene 122*, or Stay belite* Resin is concerned. But do you know about *all* the helpful materials it signifies? Would an acquaintance with them mean a better product for you—or an improvement or short-cut in your processing?

Ranging from chemical cotton for rayon tire cord to nitrocellulose for lacquer finishes, Hercules products have become of major importance in the manufacture of synthetic rubber, as well as in compounding, tire cord manufacture, reclaiming, and the formulation of rubber-base adhesives. They bring you the results of continuous research and development in almost every phase of application.

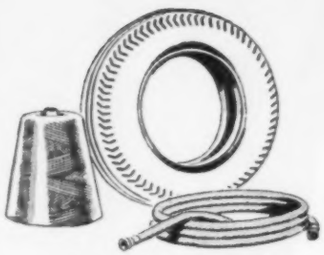
The significance, to you and your customers, of specific Hercules developments will form the basis of further advertisements. Watch for them. Meanwhile, the 48-page book, "Hercules Products," lists and describes the many materials now available. Write for your copy today.

HERCULES POWDER COMPANY
INCORPORATED
918 Market Street, Wilmington 99, Delaware

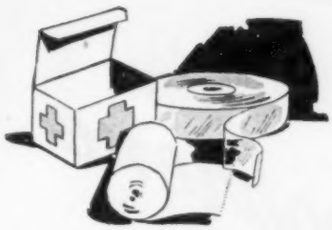
IT PAYS TO KNOW *MORE* ABOUT

HERCULES

YOUR GUIDE TO IMPROVED PROCESSES AND PRODUCTS

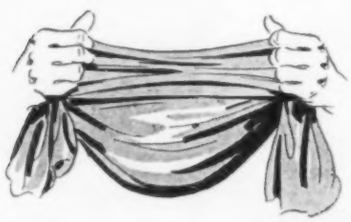


Chemical Cotton...
Basis for the toughest high-tenacity rayon for automobile tires, hose, belting, and other rubber products.



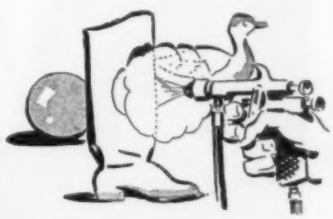
Staybelite Esters...
Low-cost tackifiers, compatible with all synthetic rubbers. Valuable in pressure-sensitive adhesives.

Dresinate 731...
One of Hercules many resin derivatives, Dresinate* 731 is the emulsifying agent used to make GR-S-10.



Dipentene 122...
An excellent solvent for rubber reclaiming. Raises tensile strength, lowers modulus, increases elongation.

Solvenol...
A stronger solvent than Dipentene, with a slower rate of evaporation. Widely used in rubber reclaiming.



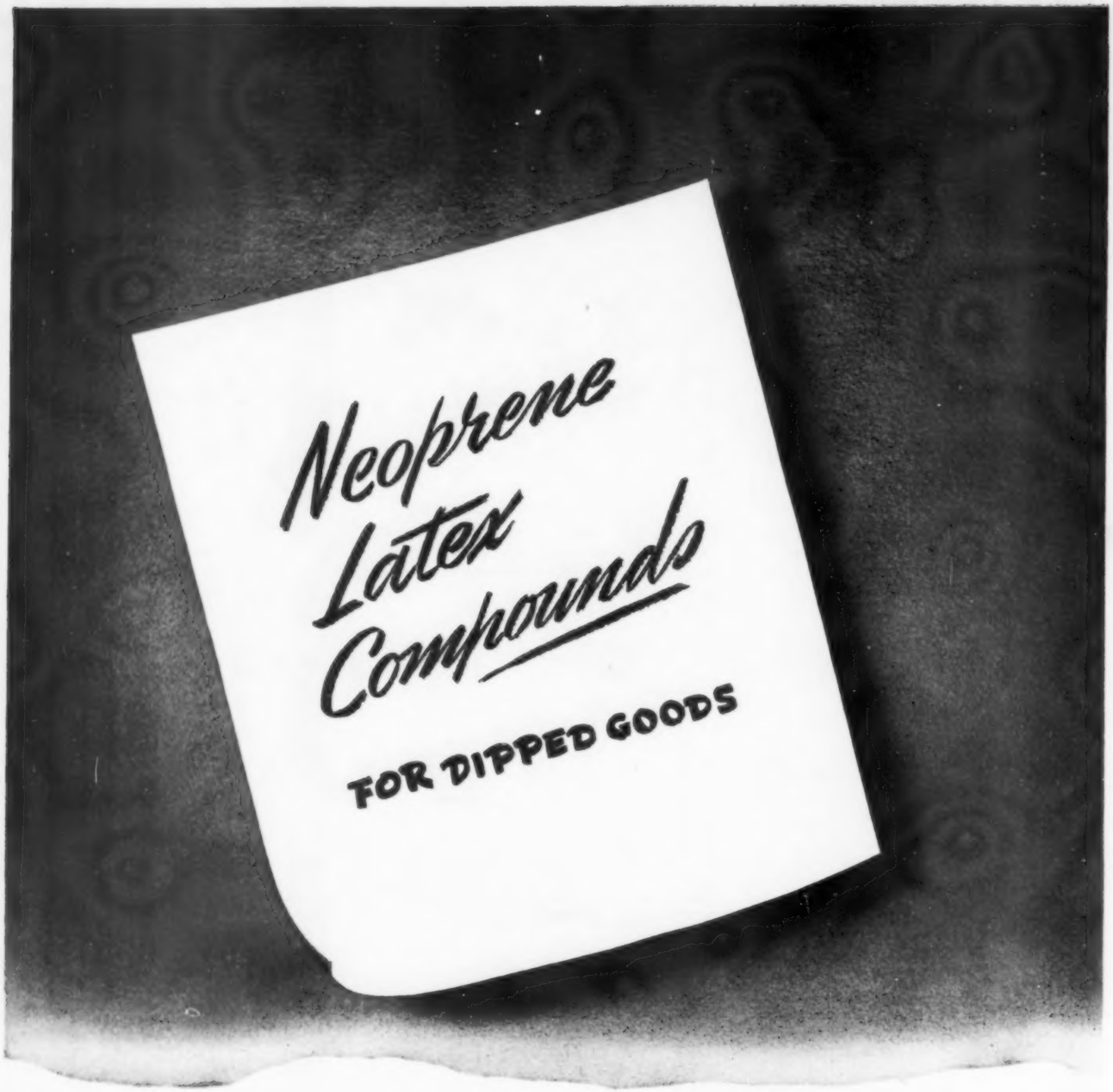
Nitrocellulose...
Hercules nitrocellulose and ethyl cellulose provide lacquers of maximum adhesion, durability, gloss, and color.

Back of every Hercules development for the rubber industry are Hercules' vast research facilities. In this laboratory, extending over 37 acres, more than 600 workers strive constantly to improve materials and finished products. Why not let them help you on your next problem?

*Reg. U. S. Pat. Off. by Hercules Powder Company

R-61

CHEMICAL MATERIALS FOR THE RUBBER INDUSTRY



General Latex has developed several simplified neoprene latex compounds for dipped goods. These compounds are thoroughly "tried and proven" and in current use in many factories. Neoprene latex offers advantages not found in natural rubber latex—more particularly, high resistance to oxidation, sunlight, oils, and chemicals. If you are considering the manufacture of any dipped product, we suggest that you get in touch with our technical staff. Their years of experience with natural and neoprene latex will prove very helpful in formulating a neoprene compound custom-made to your specific needs.

General Latex
& CHEMICAL CORP.

666 MAIN STREET, CAMBRIDGE, MASS.

Vultex Division — Verdun Industrial Buildings, Verdun, Montreal, Quebec

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

Make a better
LEATHERETTE
with
SYNTRON

Through years of constant laboratory research, Gordon-Lacey has evolved formulas for SYNTRON COATINGS to make *better* LEATHERETTE.

LEATHERETTE made with SYNTRON Coatings produces a finish that is (1) TOUGH and DURABLE; (2) ABRASION-RESISTANT; (3) SOFT and FLEXIBLE; (4) RESISTANT to ACIDS, ALKALIS and CHEMICALS; (5) RESISTANT to OILS and GREASES; and (6) 100% WATERPROOF.

If you have a special coating problem

. . . Gordon-Lacey can develop a *custom-made* coating to fit *your* individual needs . . . a coating that is exactly right for your particular requirements, whether for cotton, rayon, nylon, fiberglass or any other fabric surface. Gordon-Lacey research laboratories are ready to solve your coating problems regardless of the trade you service. Send us the story of your coating problems.

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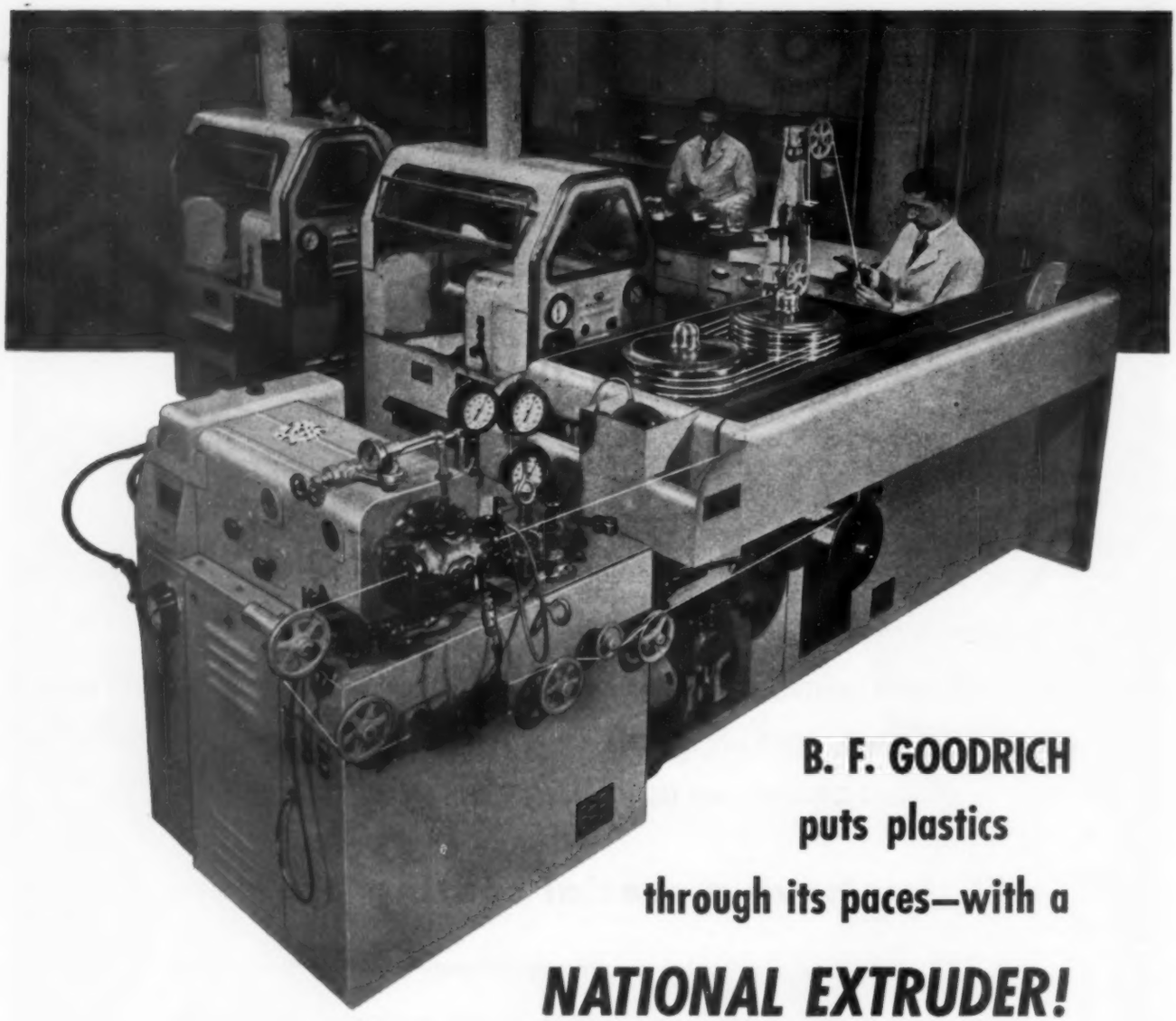

B. F. GOODRICH puts plastics through its paces—with a NATIONAL EXTRUDER!

IN the B. F. Goodrich Chemical Company's laboratory, a National extruder is used to test the extrusion qualities of new compounds under actual operating conditions. The same qualities which make National a natural choice for this purpose can help *you* in *your* plastics production!

Research of this kind demands flexibility. Today there's a run of one type material; tomorrow a different material is extruded in different sizes, at varied temperatures and speeds. National extruders provide this *flexibility, plus* the *exacting accuracy of performance* so essential in both laboratory and production line equipment.

If the plastics products you plan to make require exacting tolerances, continuous, dependable and economical production, or flexibility to process a wide variety of materials, sizes, or shapes, look to National Rubber Machinery Company—the world's largest maker of plastics extrusion equipment. Write today for your copy of our new, complete catalog of extrusion equipment.

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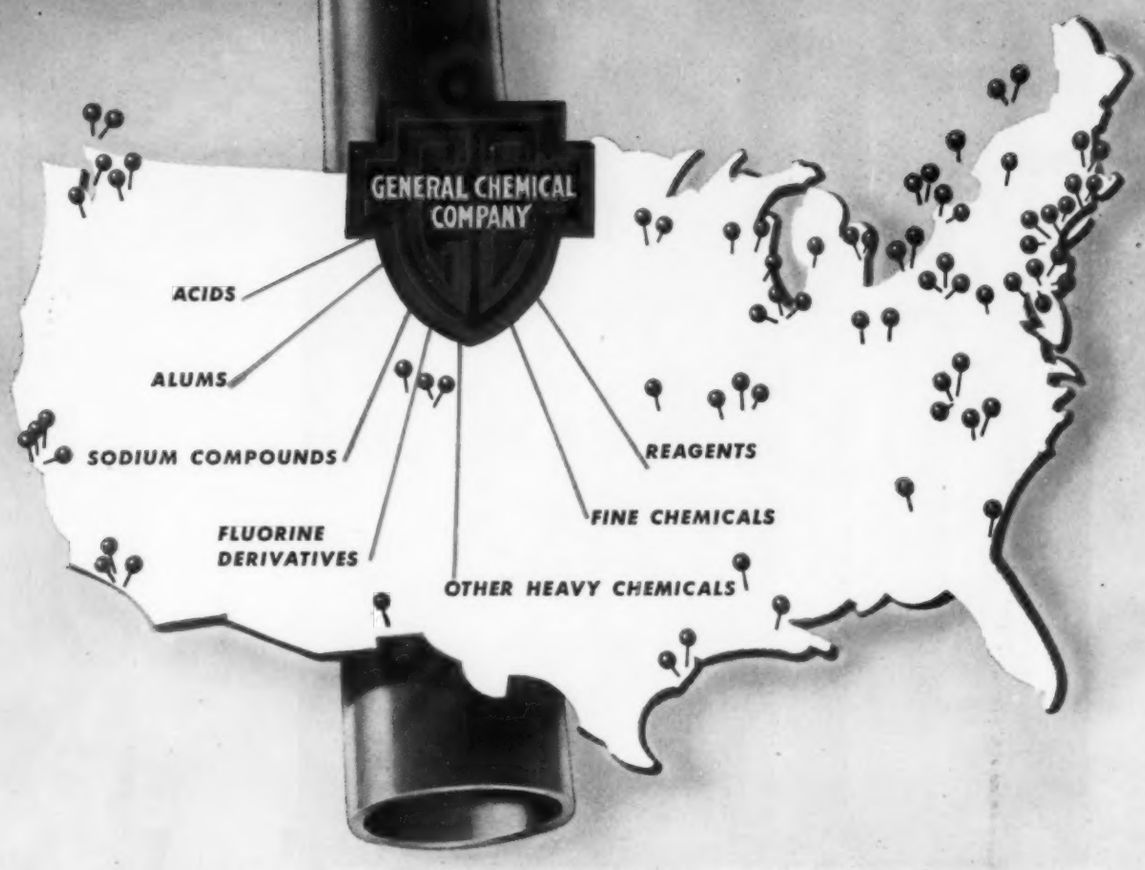
General Offices: Akron 11, O.

Plastics
MACHINERY DIVISION

Supply Line for American Industry...



Here is the supply line of Basic Chemicals for American Industry. North, South, East or West . . . wherever the needs are greatest . . . there, too, are the heaviest concentrations of General Chemical *plants, warehouses,* and *technical service offices*—equipped and prepared to meet the chemical demands of the day.

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FOR AN IMPORTANT PRODUCTION

Even without unduly stretching one's imagination, this could be an imposing back-drop for a ballet.

• In reality, it *is* a stage setting for the final act in the production of St. Joe lead-free Zinc Oxides—showing a section of filter bags in the bag room of the St. Joseph Lead Company's zinc oxide plant at Josephtown, Pa. Originating in the Company's zinc mines at Edwards and Balmat in northern New York, the zinc oxide is now entering the last lap of its long and complicated journey from ore to finished product. From here, in paper bags or wooden barrels, St. Joe lead-free zinc oxides are shipped to the consuming industries where—by virtue of their uniform high quality—these St. Joe pigments, in turn, add to the inherent quality of the many products in which they are used.

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Lead-Free

ZINC OXIDE

MADE BY THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

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•

1946 Year of Opportunity

Remembering the fearful price the world has paid across the counters of war, let us turn our hearts, our minds, and our energies to the task of building an enduring structure of peace. No less a monument can serve to honor those who, in freedom, gave their lives that freedom might survive.

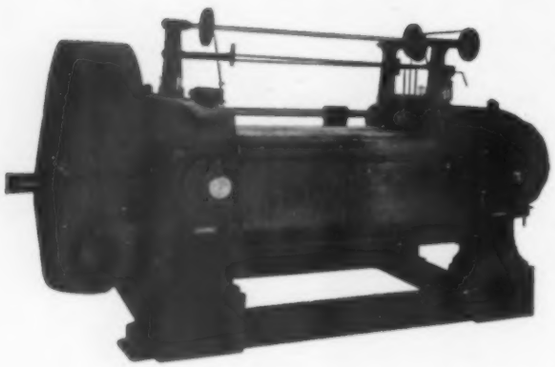
With this thought we extend to our many friends sincere good wishes for the New Year.

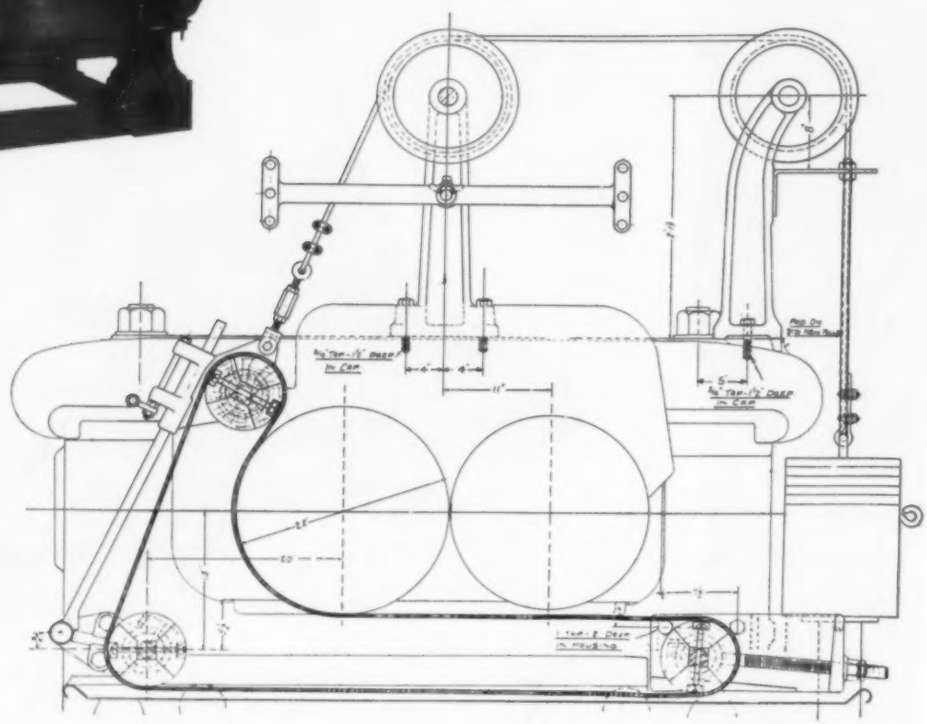
HERMAN MUEHLSTEIN
Chairman of the Board

H. MUEHLSTEIN & Co. INC.

Save up to 20% in Milling Time with a . . . . . MILL APRON

Throw away the broom and shovel. Use this modern way of mixing rubber and pigments. Records of users show a saving in milling time from 10 to 20%—an economy especially desirable today to help overcome the shortage of labor.





The belt is brought in and out of position by air cylinder and mechanism that works instantly upon operation of air valve.

Mill aprons are available for any size mill up to 84″. When ordering advise type of mill or send drawings so that the proper installation brackets and accessories can be furnished.

The use of our mill apron also eliminates a large part of the hard work in milling and masticating — and reduces the dust element as well. In wide use today to help overcome longer milling time of synthetics.

The Akron Standard Mold Co.

Akron — "The Established Measure of Value" — Ohio

Check these 5 new outstanding characteristics of ACRAWAX C

1. **anti-block**
2. **anti-tack**
3. **speeds up production by eliminating "stick" on the mill or calender**
4. **mold and die lubricant**
5. **moisture and solvent resistance**

Small percentages of high melting point (280°F.) ACRAWAX C incorporated into plastics and elastomers are producing excellent results.

TYPICAL SUCCESSFUL APPLICATIONS:

Unsupported films or sheets—vinyls, Neoprene, GR-S, for anti-block and anti-tack.

Coatings—vinyls, polyvinyl butyrals, nitrocellulose, for anti-block and anti-tack.

Molded articles — synthetic elastomers, thermoplastic and thermosetting resins, for mold release.

Hot melts — of many types and for many purposes, as those used for coatings, impregnations, sealants, potting compounds, etc., have benefited greatly from the desirable characteristics of ACRAWAX C.

IN ADDITION to solid and granule form ACRAWAX C is available as

1. **POWDERED** — approximately 100 mesh
2. **ATOMIZED** — approximately 3 microns

In these finely divided forms, greater ease of processing and incorporation into the blend is obtained.

For further information on ACRAWAX C write to Dept. R.A.

GLYCO PRODUCTS CO., INC.

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CHECK THESE 2 PERFORMANCE PROVED CEMENTS AGAINST YOUR NEEDS!

N-100 SELF-CURING ADHESIVE ✻

for cementing together or one to another raw fabrics, coated fabrics, molded parts, leather, wood, paper, tubing, sponge, channel-stock, stripping and sheet material . . . *as a Sealant* for rubber and synthetic valve seats, gaskets, etc.

A Two-Part Neoprene Base Formula of Brush Viscosity and Neutral in Color

. . . Extremely high green strength . . . Good strength after standing 3 to 4 hours . . . Optimum cure reached in 10 days at 68-70° F (in 16 hours at 100-125° F; in 1 hour at 255-260° F) . . . Excellent water, oil, flame and delamination resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid . . . Extremely high shear strength . . . Contains no Benzol.

N-800 NEOPRENE PUTTY ✻

for Filling rubber, neoprene and other synthetic rubber parts . . . *for Repairing* wire cable . . . *as a Binder . . . and for Caulking.*

A Two-Part Neoprene Base Formula of Putty Consistency and Black in Color

. . . Bonds without Primers . . . Optimum cure reached in 10 days at 68-70° F (in 16 hours at 100-125° F; in 1 hour at 255-260° F) . . . High dielectric strength . . . Excellent water, oil and flame resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid.

✻ Both of these formulas have been performance-proved in important war production work over a period of several years.

Address all inquires to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard St., Cambridge 42, Massachusetts.

UBS

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Serving Industry with Creative Chemistry

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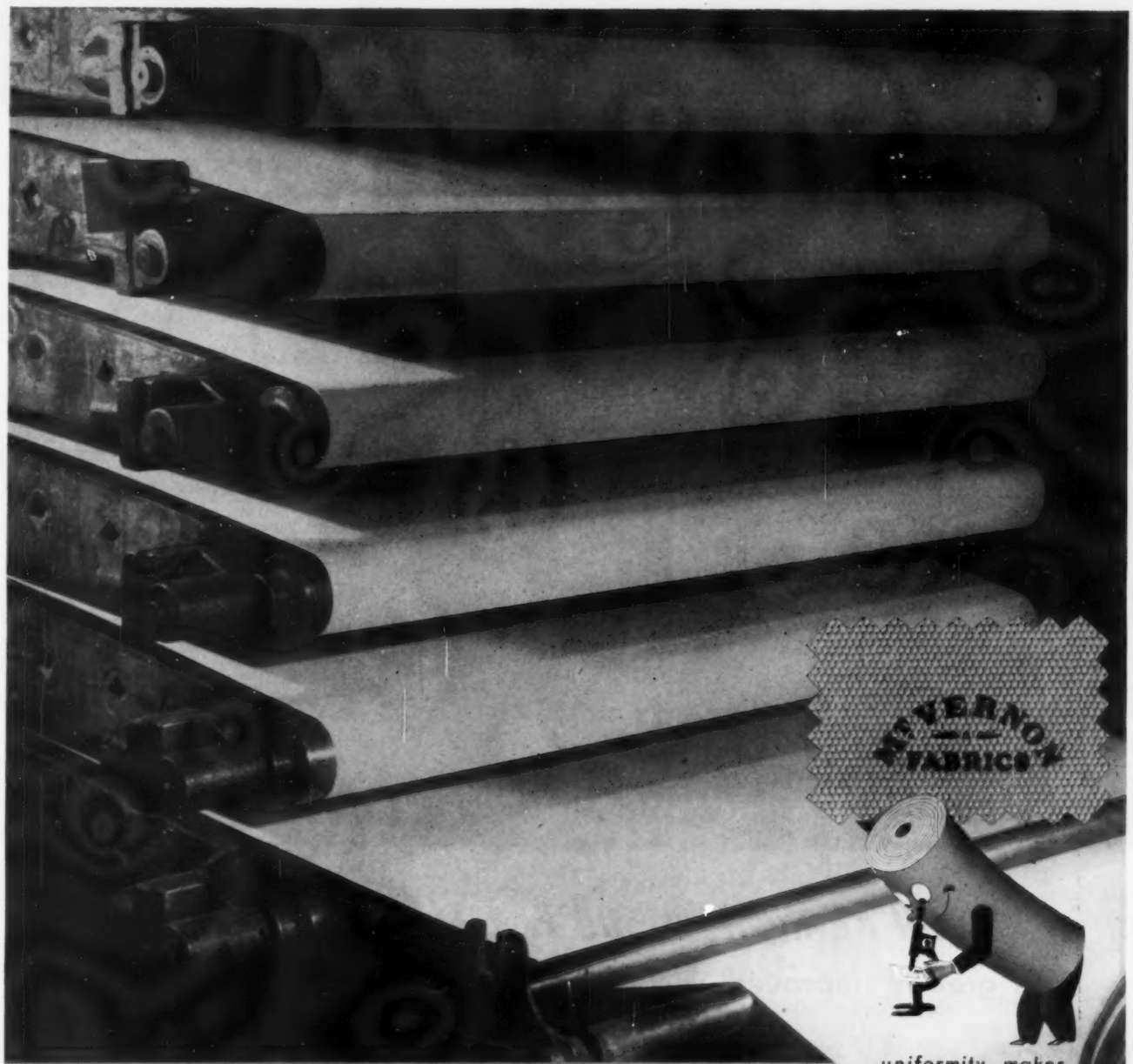
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS



IT HAS TO BE UNIFORM BEFORE RUBBER CAN TOUCH IT

Guided by close laboratory control, MT. VERNON fabrics are inspected and checked through every step of manufacture to produce the more uniform weave that means uniform qualities of absorption, strength, toughness, resiliency, and flexibility—known qualities you can depend on consistently when you specify the top-grade cotton quality of MT. VERNON fabrics.

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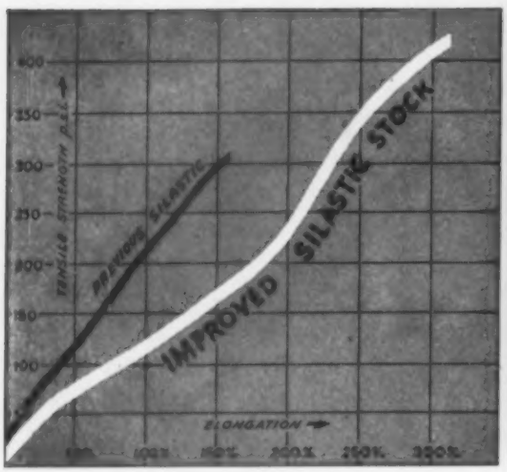
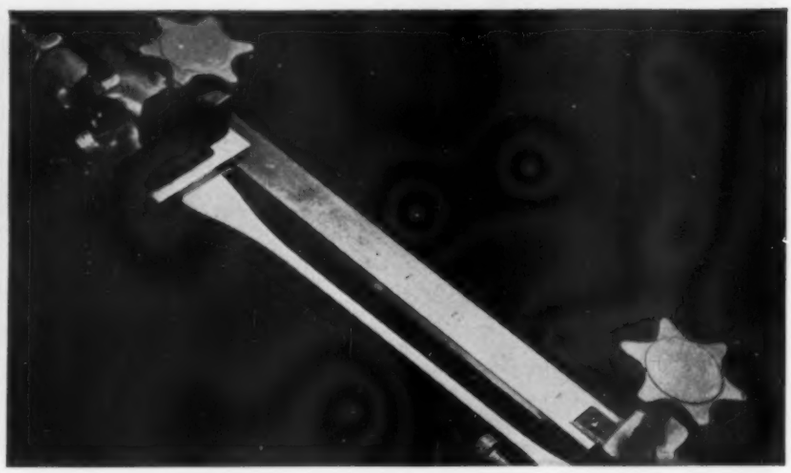
NOW COMMERCIALLY AVAILABLE

NEW and IMPROVED

SILASTIC

DOW CORNING SILICONE RUBBER





Still Resilient at 500°F. • Flexible at −70°F.

Plus greatly improved TENSILE STRENGTH—up from 200-330 to 280-500 p.s.i.

ELONGATION—up from 70-115% to 150-300%

Silastic* makes history—*again!*

Big new improvements in this unique silicone rubber surpass even the previous history-making Silastic achievements! The *NEW AND IMPROVED SILASTIC* is ready—*NOW*—for many more difficult jobs at extreme high and low temperatures. It offers radically improved physical properties, excellent dielectric values, and resistance to oxidation and ozone.

Earlier stocks supplied urgent wartime demands for elastic materials serviceable above and below temperature limits of natural and organic synthetic rubbers. New stocks perform even better—both at extreme and moderate temperatures.

Look to Silastic for insulating lead wire and appliance cords; for gaskets subjected to severe service conditions; for insulating heating elements and resistor coils; for coating glass fabrics.

*TRADE MARK, DOW CORNING CORPORATION.

New Silastic Stocks Available For

MOLDING • EXTRUDING • LAMINATING • COATING

For data sheets and recommended methods of fabricating these new Silastic stocks, write to

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

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FIRST IN SILICONES

RUBBING-OUT ERASING TROUBLES

SUN RUBBER PROCESSING OIL...

Solves Problem for Eraser-Manufacturer Using Increased Amounts of White Substitute

Gray smudges, greasy smears that wouldn't rub clean . . . that was the problem of one of the country's foremost eraser manufacturers.

Restrictions on reclaim, Neoprene, and Buna S. forced an increased use of white substitute. But erasers, made to the new formulas, had a greasy look, couldn't be sold by a house whose name and reputation are known to schoolboys and businessmen across the country.

Plant-engineers called in a Sun Engineer, who studied their processes, recommended that they change from the oil they used previously to a Circo Light Processing-Oil, developed by Sun for the rubber industry.

Greasy surfaces practically disappeared, and production on the new formulas began. In addition, evaporation of oil during the vulcanization was greatly reduced.

Solving problems like this is no novelty for Sun Engineers and Sun Processing Oils.

Now, as you plan to meet the changes in natural and synthetic supplies . . . or whenever processing-problems arise . . . call the Sun man near you and get the latest information on Sun products for better rubber. Or write . . .

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

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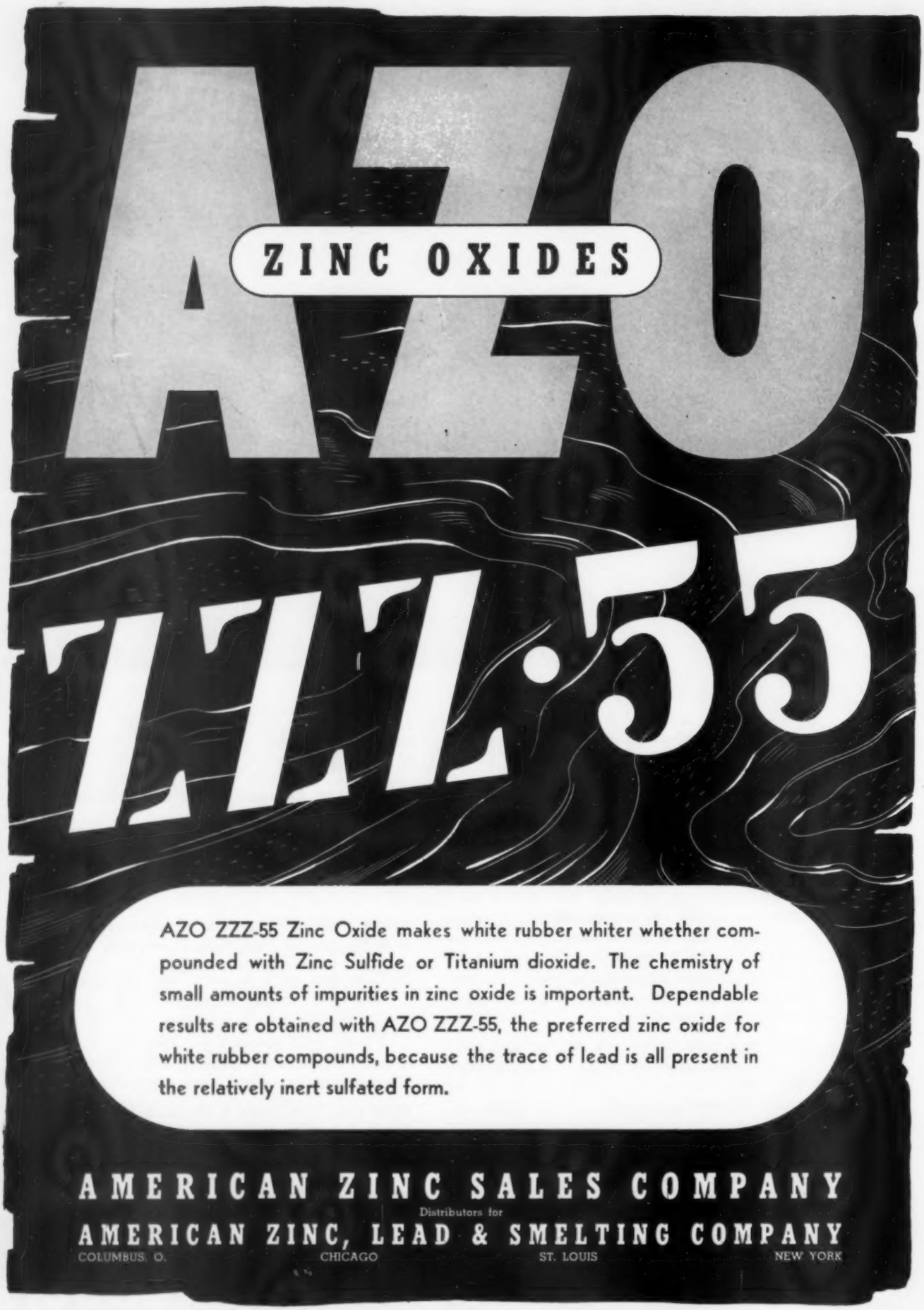
SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY


AZO
ZINC OXIDES
ZZZ-55
AZO ZZZ-55 Zinc Oxide makes white rubber whiter whether compounded with Zinc Sulfide or Titanium dioxide. The chemistry of small amounts of impurities in zinc oxide is important. Dependable results are obtained with AZO ZZZ-55, the preferred zinc oxide for white rubber compounds, because the trace of lead is all present in the relatively inert sulfated form.
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Distributors for
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AN OLD-FASHIONED PORTRAIT COMES TO LIFE

It has been a memory — a happy memory to millions of motorists. It was a beauty as they remembered it, worthy of admiration for its handsome appearance and fine, serviceable life . . . A cherished picture, yes; but it HAS come back to reality. With the release of Butyl rubber and the availability of SILENE EF a *better* inner tube is the order of the day. SILENE EF makes that *better* tube possible. It assures success in color compounding for *red* tubes . . . SILENE EF is essential in non-black Butyl tube compounds to give them the processing qualities, and the good cured physical properties unobtainable when clays or whitings are used alone as the principal loading pigment.

SILENE EF

STANDARD Chemical Company

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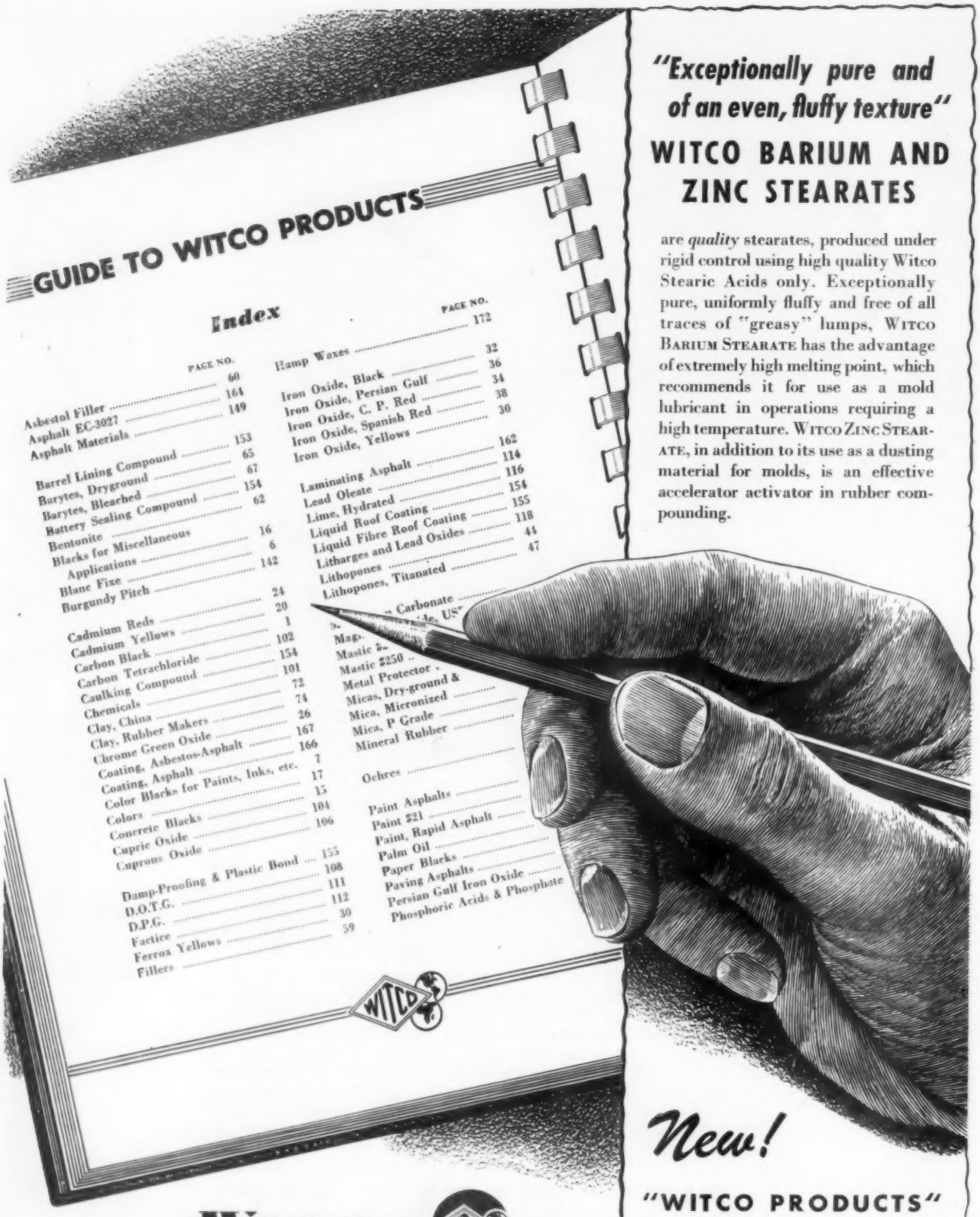

"Exceptionally pure and of an even, fluffy texture"

WITCO BARIUM AND ZINC STEARATES

are *quality* stearates, produced under rigid control using high quality Witco Stearic Acids only. Exceptionally pure, uniformly fluffy and free of all traces of "greasy" lumps, WITCO BARIUM STEARATE has the advantage of extremely high melting point, which recommends it for use as a mold lubricant in operations requiring a high temperature. WITCO ZINC STEARATE, in addition to its use as a dusting material for molds, is an effective accelerator activator in rubber compounding.

New!

"WITCO PRODUCTS" BOOKLET

gives complete and up-to-date information on Witco Stearates and all other Witco products...conveniently arranged for ready reference. Write for your copy today.

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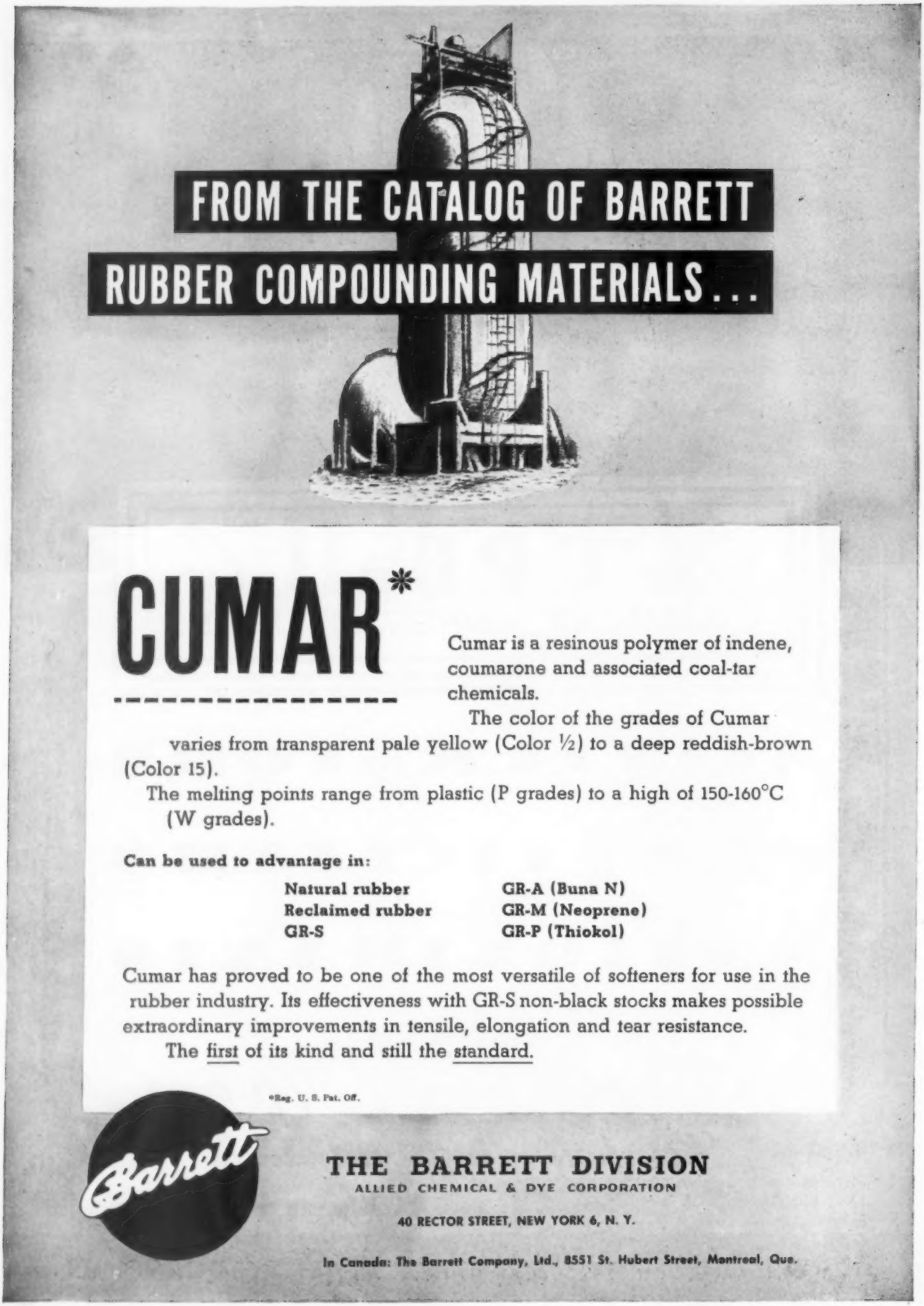
A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.



CUMAR*

Cumar is a resinous polymer of indene, coumarone and associated coal-tar chemicals.

The color of the grades of Cumar varies from transparent pale yellow (Color ½) to a deep reddish-brown (Color 15).

The melting points range from plastic (P grades) to a high of 150-160°C (W grades).

Can be used to advantage in:

Natural rubber	**GR-A (Buna N)**
Reclaimed rubber	**GR-M (Neoprene)**
GR-S	**GR-P (Thiokol)**

Cumar has proved to be one of the most versatile of softeners for use in the rubber industry. Its effectiveness with GR-S non-black stocks makes possible extraordinary improvements in tensile, elongation and tear resistance.

The first of its kind and still the standard.

*Reg. U. S. Pat. Off.

Barrett

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In Canada: The Barrett Company, Ltd., 8551 St. Hubert Street, Montreal, Que.

BAKER
PLASTICIZERS

IMPART

Retained Flexibility

TO

VINYL RESINS — CELLULOSE RESINS

PHENOL FORMALDEHYDE RESINS

MELAMINE RESINS — STYRENE RESINS

UREA FORMALDEHYDE RESINS

AND

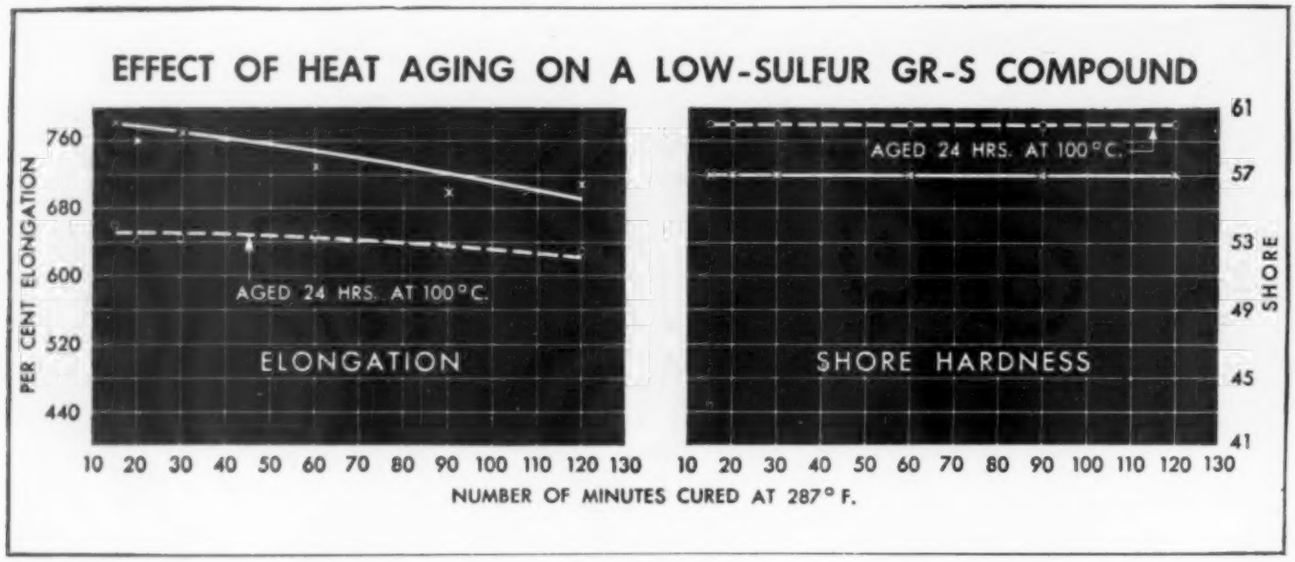
GR-S — GR-N — GR-M

THE
BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York 5, New York

Chicago, Illinois — Los Angeles, California



Physical Properties of GR-S Compounds Stay Put with New Low-Sulfur Formula

Heat resistance now made practical by F.B.S LITHARGE

FORMULA

GR-S (Institute)	100
E.P.C. Carbon Black	40
Sulfur	0.75
Zinc Oxide	3.0
Benzothiazyl Disulfide	1.0
F.B.S. Litharge	1.5
Coaltar softener	5

Data:

Time 287° F.	Tensile Strength	% Elong.	Modulus 300% Elong.	Shore Hardness
15	2890	780	640	57
20	3010	760	660	57
30	3090	770	660	57
60	2960	730	660	57
90	2850	700	685	57
120	2960	710	700	57
Aged 24 Hours at 100° C				
15	2970	660	980	60
20	3030	640	1020	60
30	2980	645	1000	60
60	3260	650	1040	60
90	3060	630	1130	60
120	2930	630	1040	60

OUTSTANDING CHARACTERISTICS:

The F.B.S. Litharge-thiazole combination used with low sulfur is characterized by the following:

1. Heat stability • **2.** Fast curing rate • **3.** High flat modulus **4.** Excellent general physical properties • **5.** Processing safety **6.** Efficiency • **7.** Economy.

High retention of physical properties . . . how important is that to you?

Your GR-S can have it, merely by changing to a low sulfur formula.

Now such a compound can be cured in a practical time and without extra quantities of accelerator.

F.B.S. Litharge plus benzothiazyl disulfide is what produces safe, fast cures with low sulfur content.

The curing period can be varied from 15 to 120 minutes with scarcely any effect on elongation, hardness or modulus.

Moreover, the effect of aging on samples cured for various periods is almost uniform.

Reference to the accompanying tables and charts should be convincing.

• • •

Ask us to send you a printed report, "Compounding of GR-S for Heat Resistance," issued by the Rubber Division of our Research Laboratories, which covers the subject of F.B.S. Litharge for low sulfur formulas in greater detail and from a number of additional angles. Write to

NATIONAL LEAD COMPANY

Rubber Division: 105 York Street, Brooklyn, N. Y.

New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

DRASTIC PRICE REDUCTIONS

ON

SHARPLES ETHYLAMINES

Open New Research and Industrial Fields

The recent price reductions of Sharples Ethylamines are of such magnitude as to change radically previous ideas of the chemical industry with regard to fields of application. Many processes using the Ethylamines as solvents or reactants which were formerly economically impractical should now become commercially feasible and should be reconsidered. The possible utility of the Ethylamines in your manufacturing operations warrants immediate investigation.

Sharples Ethylamines are available in unlimited quantities. Specifications and use information are given below. Samples and a complete schedule of prices will be sent promptly upon request.

Specifications	Monoethylamine (70% aqueous sol'n)	Diethylamine	Triethylamine
Color	Water-white	Water-white	Water-white to light straw
Specific Gravity @ 20/20° C.	0.79 - 0.80	0.71	0.74 - 0.76
Water Insolubles	None	None	—
Minimum Amine Content	70.0% as Monoethylamine	98.0% as Diethylamine	88.0% as Triethylamine
Distillation: Initial boiling pt.	—	53.0° C. minimum	72.0° C. minimum
Final boiling pt.	—	59.5° C. maximum	95° C. maximum

PRESENT AND SUGGESTED USES

MONOETHYLAMINE 70% aqueous solution	DIETHYLAMINE	TRIETHYLAMINE
PETROLEUM: Solvent extraction; preparation of amides useful in refining of lubricating oil; complex salt with CuCl useful for recovery of diolefins; intermediate for preparation of demulsifier.	**PETROLEUM:** Solvent extraction; preparation of amides useful in refining of lubricating oil; complex salt with CuCl useful for recovery of diolefins; intermediate for preparation of gasoline stabilizer.	**PETROLEUM:** Agent for improving recovery of catalyst in fluid cracking operations.
SOLVENT: Selective solvent in petroleum and vegetable oil refining; solvent for wide range of organic compounds.	**SOLVENT:** Selective solvent in petroleum and vegetable oil refining; solvent for wide range of organic compounds.	**SOLVENT:** Catalytic solvent in chemical synthesis; solvent for many organic compounds; stabilizer for certain chlorinated hydrocarbons.
TEXTILE: Intermediate for synthesis of surface active agents, dyestuffs and sizing compounds.	**TEXTILE:** Intermediate for synthesis of surface active agents, dyestuffs and sizing compounds.	**TEXTILE:** Preparation of wetting, penetrating and waterproofing agents of quaternary ammonium types.
RUBBER: Synthesis of vulcanization accelerator; stabilizer for latex.	**RUBBER:** Intermediate for synthesis of a number of ultra-accelerators of vulcanization and acclerator activators for natural and synthetic rubbers.	**RUBBER:** Preparation of accelerator activator for natural and synthetic rubbers.
PLASTICS: Condensing agent for urea-formaldehyde molding mixtures; preparation of various nitrogen ethylated amides which are useful as plasticizers; condensation products with other resin forming materials useful as moldings, coatings, adhesives and sizing compounds.	**PLASTICS:** Condensation with other resin forming materials to give products useful for moldings, coatings, plasticizers and polishes.	**COSMETICS:** Preparation of emulsifying agents and germicides.
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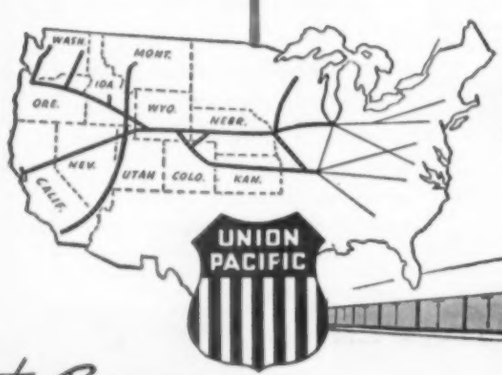

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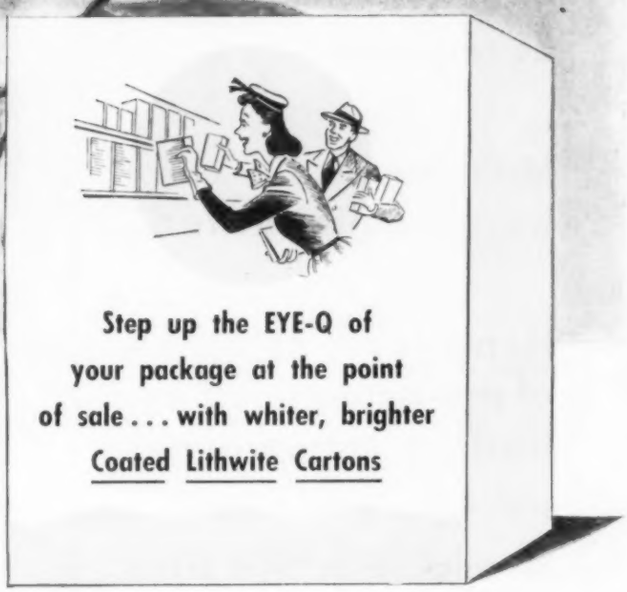

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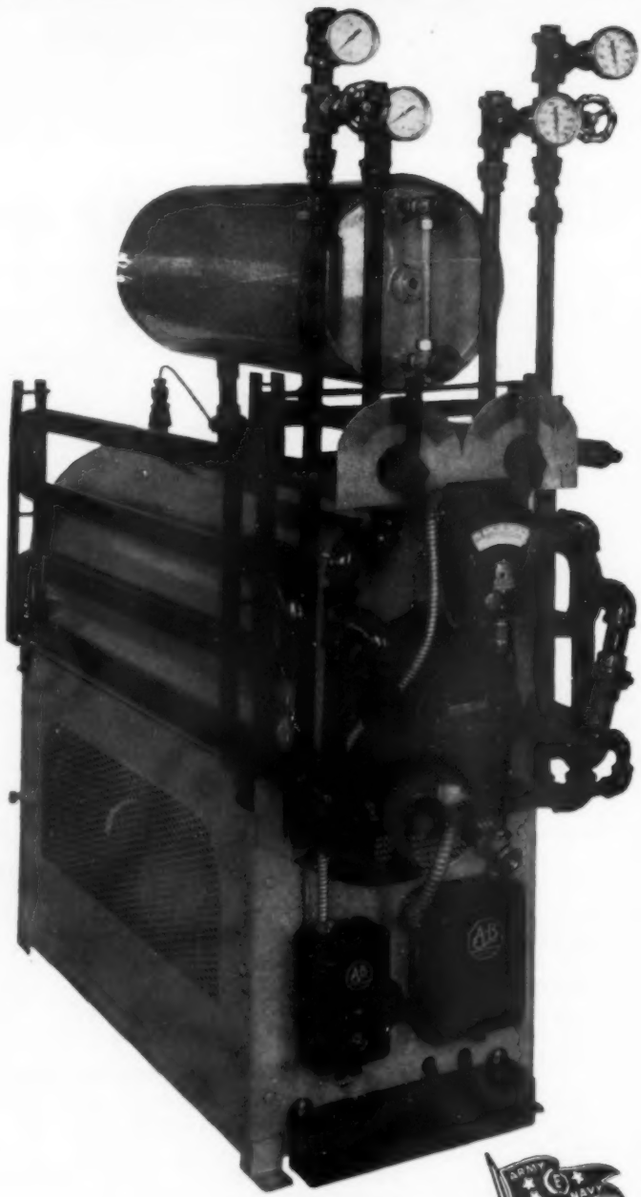

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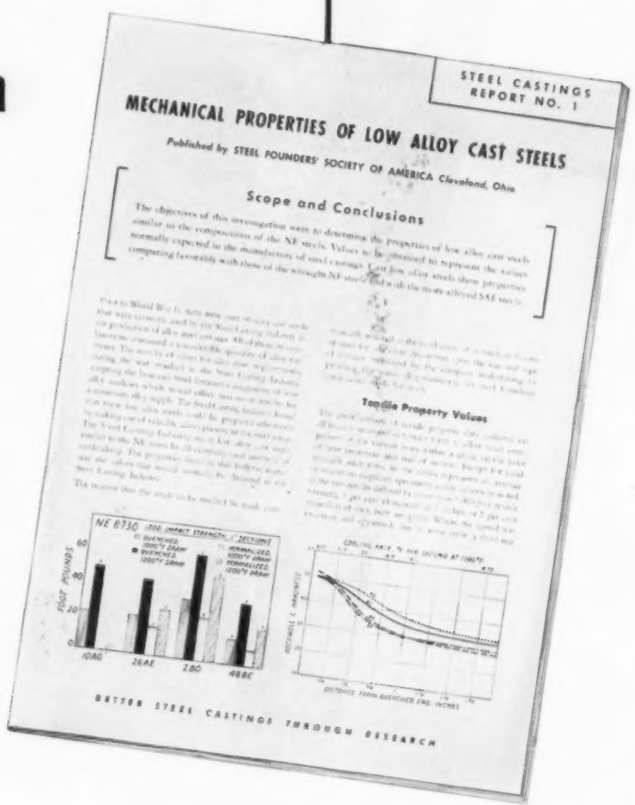
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NUMBER 4

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Published on the 15th of each month by
PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York 19, N. Y.

New England Representative—F. ROYAL CAREY. P.O. Box 133. Providence. R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago 1, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $3.00 a year; Canada, $3.50; Foreign, $4.00. Single copies up to 3 months old, 35 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924.

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VOL. 58, No. 4 JANUARY, 1946

Electrostatics in the Rubber Industry

By ROBIN BEACH

*Head, Robin Beach Engineers Associated, 32 Court St., Brooklyn, N. Y.**

THE increasing numbers of fires and explosions throughout the many processes in the rubber industry have become "nightmares" to safety engineers, to management, and to operating personnel. The potentialities of serious consequences from these causes to physical plant and to employees continually hang over the heads of production departments like the proverbial "Sword of Damocles."

In many instances, management has been too tolerant of the economic losses resulting from electrostatic invasions and too inconsiderate of the mounting fears of operators as induced by the continually threatening spectre of personal injuries. This acquiescent attitude is inexcusable in view of the fact that electrostatic hazards can be, and have been, controlled to the extent of their practical elimination through prescribed methods of scientific approach to the various types of problems.

As in many another highly specialized field, so in this one, these problems which are peculiar to its particular processes and manufacturing operations can be solved through a coordinated analysis of all their pertinent basic factors and variables in association with specific knowledge of their inter-related influences and effects.

Note: This material was originally prepared for presentation at the 1945 meeting of the Rubber Section of the National Safety Council. The meeting was not held because of transportation difficulties.

* Mr. Beach is also head of the Electrical Engineering Department of the Polytechnic Institute of Brooklyn, Brooklyn, N. Y., and an associate of McCrossin & Co., Engineers, 120 Wall St., New York, N. Y.

The larger rubber companies maintain extensive scientific facilities through their staffs of engineers, physicists, and research investigators, and the outstanding achievements of these specialized staffs proclaim their capabilities in those fields wherein their services have been directed along and confined to the channels of their especial qualifications and talents.

For the most part, these specialists have not had the opportunity of acquiring the requisite preparation for and the basic experience in conducting investigations on industrial electrostatics. It is an interesting commentary that where investigations in attempting to mitigate electrostatic hazards have been undertaken by "home talent," generally under additional handicaps of little official support and of inadequate appropriations, their efforts have failed. In consequence, the insidious onslaughts and the economic tolls of this "saboteur" have continued practically unabated.

Throughout the rubber industry, the fear of electrostatic fires and explosions has resulted in an appreciable curtailment of production where plant management has maintained traditionally slower processing speeds, tolerated the customary spoilage of costly stocks, and continued ineffectual methods in attempting electrostatic control. From the viewpoint of its hazards, static electricity need impose no limitation whatsoever upon the machine speeds employed in rubber processing, no losses of processed stock, and no dissipation of the peace of mind of operators.

Obviously, it is not economical either to tolerate fire and explosion losses of physical plant or to suffer reduction of maximum production. Also, it is not good management to permit employees to labor on electro-hazardous operations in constant fear of the use of "hot" solvent swabs, while their memories still recall the shocking experiences of fellow workers who suffered as "human torches"—especially where all of these electrostatic hazards can be completely and inexpensively eliminated.

Types of Problems

From his experience in investigating electrostatic hazards in practically every phase of the rubber industry, where they abound, the author has found the chief sources of fires and explosions among those operations which are listed below and which are arranged roughly in the order of their economic loss:

Post-dip drying	Belt building
Band building	Re-rolling calendered stock
Bias cutting	Tire building
Rubber spreading	Pre-dip drying
Cementing operations	Solvent dispensing
Tackifying stock	Rubber film manufacturing
Calendering	Pulverizing and grinding

Dusting calendered stock

An annoying problem in the process of curing is the occasional occurrence of separation between the insulated bead and the ply-fabric which makes up the tire carcass. As this happens only in the final stage of cure, making the finished tire worthless, all of the labor and much of the material that has gone into the tire from the beginning has been wasted. Only a small recovery is accomplished by reclaiming the rubber. These failures are attributed in many cases to the loss of adhesion of the calendered rubber with the fabric, which condition is aggravated by the excessive moisture absorbed by the fabric in those intermediate operations where high humidity is maintained to control the electrification of the ply-stock. These subversive ill-effects of high humidity, in acting as a mitigating agent for static electricity, impose an economic toll here, as they do in similarly ill-advised practices throughout a number of other industries.

In the investigation of the electrostatic hazards inherent to any particular process, a detailed study of the operation is required. These studies include the following analyses and measurements:

1. All of the means must be determined by which electrification is created in the stock and electric sparks are produced.

2. The magnitude of the generated voltage should be measured, as also, the amount of the continuous flow of electricity from the ply-stock to ground.

3. The storage capability of the stock for accumulating the electric charges should be either measured or estimated—this property being known as the electrostatic capacitance of the stock.

4. The presence of flammable vapors, and their degree of fuel mixture with air, must be determined under various conditions of operation, as fires or explosions only occur from the simultaneous occurrence of electric sparks and flammable mixtures of volatile fuels with air.

5. Employees, themselves, frequently create ignition possibilities through the body electrification which they acquire either by touching charged stock or by walking upon or scuffing over dry, insulated, flooring — hence, these potential sources of fires and explosions must also be investigated quantitively.

6. Adequate ground connections should be provided for all processing machines, and conductive grounded floor covering should be installed around hazardous zones of operation. Hence, the measurement of the effectiveness of grounding is necessary to determine that the grounding resistance does not exceed recognized limits of safety.

7. In order to satisfy the equation of safety, the electrostatic capacitance of whatever mitigating means are utilized for reducing electrification must likewise be determined and its value must be maintained within known safe limits.

8. The non-sparking properties of antistatic devices themselves, even under most favorable circumstances, is critically important. Obviously, the function of electrostatic control equipment is that of mitigating rather than, by improper design and installation, of causing ignition. Hence, the non-sparking properties of all such devices must be carefully investigated, and certain criteria of safety limitations in their design must be satisfied—a precaution all too frequently neglected, even by those who are familiar with these devices.

The use of a variety of instruments has been implied above, as being essential to an investigation of the elements of any particular problem under study. The author has developed a complement of such meters, over a period of years, which possesses the desired precision for determining the quantitative measure of the electrostatic hazard, both as to electrical quantities and as to combustible mixtures. To expatiate on this subject in this paper would probably not enlighten the reader, unless he were an electrical engineer who was already familiar with instruments of the specialized types employed in electrostatic measurements.

Technical Data and Safety Criteria

In studying any specific problems on mitigating electrostatic hazards, the availability of certain technical information is essential in arriving at an adequate solution, and in testing it, by determining the important basic criteria which prescribe its factor of safety. These necessary data and criteria are:

1—the nature of the two substances which, by making contact, generate static electricity;

2—the resulting voltage between the stock and ground;

3—the current drain from the stock to ground;

4—the electrostatic capacitance of the stock or other insulated materials to ground;

5—the energy liberated by a spark from stock to ground;

6—the concentration of fuel-air mixtures throughout cycles of operation;

7—the resistance to ground throughout the floor area where the stock processing is conducted;

8—the calculated electric time constant where charged individuals create fire hazards;

9—the possibilities for induced electrification;

10—the ambient and stock temperatures;

11—the conditions of ventilation;

12—the relative humidity;

13—the history of prior stock conditioning and storage conditions for stock rolls;

14—various other technical information which is peculiar to the particular problem.

A number of these pertinent technical elements and safety criteria are explained in the following sections.

Generation of Static Electricity

Whenever two unlike substances make contact, an unbalance of the atomic and molecular forces at the interfacial surfaces causes electrons to pass from one substance to the other. In so doing, a contact difference of potential is developed between the two. This voltage rarely exceeds one volt, and, more commonly, the contact voltage is of the order of millivolts.

This contact voltage differs greatly for different kinds of substances in contact. Upon separating the two substances, if one is non-conductive, the electrons are impounded upon the surface of the substance to which they migrated. Hence, this substance contains an excess of negative electricity—the electrons—which causes it to be negatively electrified, while the other substance possesses an equal amount of positive electricity and it is positively electrified.

If one of the substances is in the form of a moving stock, such as ply-stock, coated fabric, or gum rubber stock, and the other is a metallic roll, such as calender rolls or idler rolls, the electric charges on the latter, if the rolls are grounded, either flow to ground, when they are electrons, or become neutralized, if they are positive, by attracting free electrons to them from ground. The electric charges on the moving stock, however, being impounded there by the insulating nature of the material, remain on the surface of the stock.

Whichever of the two substances in contact possesses the lower dielectric constant, this substance becomes negatively charged in every instance. The electrons in the substance of higher dielectric constant have, by definition, a greater freedom of movement under the influence of the electric stresses developed at the contacting surfaces of the two substances, and hence, the electrons migrate from it to the substance of lower dielectric constant.

The quantity of electrons which migrate from one contacting substance to the other is a function of the nature of the two substances, the pressure with which the substances are pressed together, their freedom from contamination at the interfacial surfaces, the temperature, and the relative humidity.

The pressure exerted between ordinary substances causes a more intimate contact between the interfacial atoms or molecules, and the optimum closeness of so-called contact is still an appreciable distance equal to the diameter of an atom, which is about 10^{-8} centimeter. Obviously, temperature would influence the migration of electrons, since the lattice structures of the molecules from which the electrons emerge would vibrate more or less violently depending upon the degree of heat. Also, surface moisture resulting from condensation of the water vapor in the air, or surface occlusion of gases, or other foreign contaminants, all alter the surface character of the two contacting substances, and hence, affect the extent of the electron migration.

Upon separating the two substances, the number of electrons actually retained by the negatively charged substance depends to a considerable degree upon the speed of separation. Since no substance is a perfect insulator, some of the electrons will migrate back to the other substance, during the process of separation, should they be separated slowly.

A method suggests itself whereby the generation of electrification may be substantially reduced, provided a choice of the two substances which form contact is permitted. This reduction of charge may be accomplished by chosing the two substances so that they have about the same values of dielectric constant.

In general, attempts to mitigate static electrification by this method of matching dielectric constants has been unsuccessful, because surface conditions of the contacting substances commonly undergo considerable physical variations from the presence of gaseous, liquid, or solid contaminants.

Production of High Voltage

When the interfacial surfaces of two so-called contacting substances are electrically charged, as just explained, they constitute the two plates, or electrodes, of a capacitor. Assuming their separation to be the optimum closeness of 10^{-8} cm and that the contact voltage is one millivolt, the voltage between the surfaces when they are separated to 10^{-5} cm, that is, increased by three orders of magnitude, would then be one volt; and, if they were separated to 10^{-2} cm, or three more orders of separation, this voltage would become 1,000 volts. Upon a further separation to one centimeter, the voltage would tend to increase to 100,000 volts.

Quite likely, this high voltage would not be sustained for any appreciable time, since ionization of the surrounding air, as a result of the intense electric field accompanying this voltage, would render the normally excellent insulation of the air fairly conductive. Conversely, if a substance was brought close to an electrified member which possessed a high voltage, the voltage between them would decrease as their separation decreased.

This relationship between the voltage, the quantity of electric charge, and the electrostatic capacitance is of basic importance, and in equation form, this relationship is

$$V = Q/C,$$

where "V" represents the "voltage" between the plates of the capacitor,

"Q" the electric charge on one of the plates in "coulombs," and

"C" the capacitance of the capacitor in "farads."

Creation of Electric Sparks

If two metallic plates are separated an inch or so, thus providing a capacitor, and the voltage between them is gradually increased, the intervening electric field creates forces upon the electrons within the atoms of the air molecules to such an extent that some of them are dislodged. This condition creates in the air dissociated electrons, as negative ions, and residues of the air molecules, as positive ions, — both kinds of ions being interspersed throughout the space between the capacitor plates.

The negative ions are attracted to the positively charged plate and, similarly, the positive ions migrate to the negative plate, thereby in each instance neutralizing some of the charges on the plates and thus tending to lower the existing voltage. If the voltage is supplied from an adequate direct-current source, no appreciable change in the voltage between the plates results.

If the voltage is purposely increased still more, the ionization of the air likewise increases, as does its conductivity, and still more ions of the air migrate to their respective plates. From this we see that the air is, in consequence, passing more electricity from plate to plate of the capacitor because of its increased conductivity.

Should the voltage be increased sufficiently, the ion content of the intervening air causes it to become so conductive that all the charges on one plate suddenly migrate, en masse, to the other under the attraction of their powerful electric forces. This phenomenon is an electric spark. The spark is characterized by visible brilliance, by audible sound, and by the generation of heat. During their passage, electric sparks cause new gaseous compounds to be formed, of which ozone is most conspicuous because of its pungent odor.

If a spark is sufficiently intense so that heat energy greater than a certain threshold value is produced, flammable mixtures of fuel vapors with the air can be ignited by it. Experiments which have been performed by the U. S. Bureau of Mines, by the U. S. Bureau of Standards, and by the author, have corroborated the finding that this threshold energy value for the lighter fractions of gasoline is about one-half of a milli-joule, that is, 0.0005 watt-second. This value of threshold energy is believed to hold within reasonable limits for the ignition of many of the hydrocarbon fuels. For hydrogen, the threshold energy for ignition is of the low order of 0.00002 watt-second.

The values of energy in sparks which just cause ignition of flammable mixtures of benzene vapor and air and of natural gas for specified sizes of electrodes and their spacing are shown graphically in Figure 1. This set of invaluable data is the result of meticulous experimental research conducted by the Bureau of Mines under the direction of Dr. Paul G. Guest.

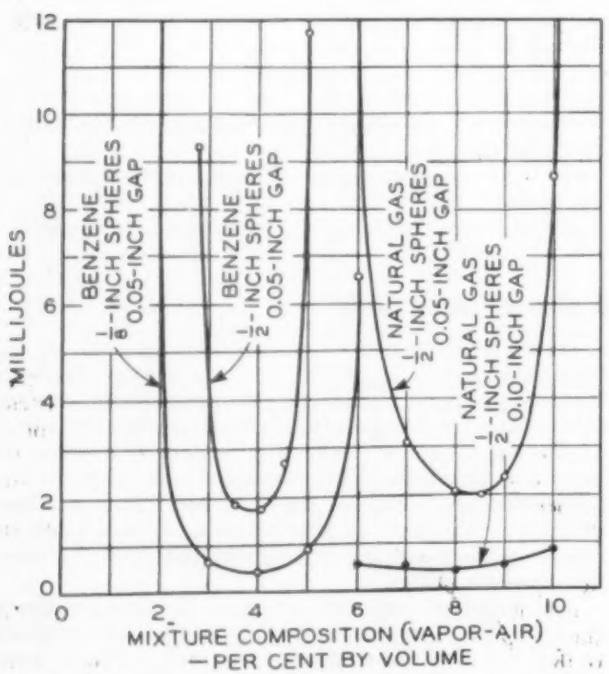

FIG. 1—Threshold values of electrostatic ignition energies for benzene and natural gas show their dependence upon fuel-air mixture, electrode size, and spark-gap length.

Since this energy originates in the spark between the electrodes of a capacitor under the driving impulse of the high voltage, it is therefore related to these two quantities and in the relationship given by the equation

$$E = 0.5 \text{ C x } V^2,$$

where "E" represents the energy of the spark in watt-seconds,

"C" the capacitance of the capacitor in farads, and

"V" the voltage between the plates.

The energy as determined from this relationship is of fundamental importance in all considerations of fire and explosion hazards where static electrification and flammable fuel-air mixtures are simultaneously present. The energy in a spark is one of the two important criteria in determining the potentiality of a fire or explosion. The other criterion is that of the percent fuel vapor by volume contained in the ambient atmosphere.

Charged Rubber Stock as a Capacitor Element

Rubber stock, such as ply-stock, coated fabric, or gum rubber stock, invariably takes on negative charges in running over metal rollers in its processing. As it leaves a grounded roll, the impounded negative charge develops a high voltage with respect to the roll or other grounded objects along its route. The voltage between it and ground may develop to a few thousand volts or even to several hundred thousand volts. The electron density at the surface of the rubber stock constitutes one plate of a capacitor with the ground acting as the other.

Should a spark occur between the rubber stock and a grounded member, complete discharge of large areas of the rubber stock does not occur here, as takes place between the conductive plates of a metallic capacitor. The electrons from remote areas on the non-conductive rubber stock cannot readily flow to the point of discharge where the spark occurs. This limitation on the number of electrons from the rubber stock entering the spark discharge is imposed by the relatively high resistivity of rubber.

The extent of area on the rubber stock from which electrons drain into a spark discharge is dependent largely upon the intervening distance between the stock and the grounded member, as well as upon the magnitude of the voltage. Where this distance is of the order of a few inches, the capacitance of the discharged area of ply-stock may range between 20 and 100 micromicrofarads, that is, between 20×10^{-12} farad and 100×10^{-12} farad.

Assuming the latter figure and with a voltage as low as 10,000 volts, a spark discharge, as determined from the relationship $E = 0.5 \text{ C x } V^2$, would release an energy of 0.005 watt-second, a value which is about ten times greater than the threshold energy for ignition. Hence, if a flammable fuel-air mixture was present in the environment of such a spark, a "flash" fire would occur in an open area, or an explosion within a confined space.

Electrification of Individuals

It is a common experience for people to acquire body electrification when walking upon dry carpet, linoleum, or concrete, during the winter months, where-

by sparks of considerable length may jump from their knuckles to doorknobs or grounded objects. On many occasions, the writer has measured voltages on people, under these conditions, which ranged between 5,000 and 15,000 volts. Also, he has measured the capacitance of many individuals, finding it to range from 100 to 200, or more, micromicrofarads. From this information the potential fire and explosion hazards resulting from body electrification may be strikingly demonstrated by the following illustration.

Assume a person has a capacitance of the lower limit of 100 micromicrofarads and he is charged to the conservative voltage of 10,000 volts. When he draws a spark at, say, a gas range, the energy liberated by the spark is 0.005 watt-second, or several times the threshold value for ignition, as already explained. As has been frequently shown, this energy can readily ignite a gas burner.

The fire hazards which individuals create by their body electrification are intimately related to the electrical resistance between their bodies and ground, that is, through their footgear. Assuming a grounded flooring, this electrical resistance includes that of their skin, essentially the soles of their feet within the footgear, their hosiery, and the soles of their shoes.

Extensive measurements taken by the author have shown these resistances to range from a few thousand ohms, with so-called conductive footgear, to values in excess of 10^{11} ohms, where rubber soles and insulating hosiery were worn. In the interests of safety from electrostatic fire hazards, this resistance should be of a relatively low order, preferably less than ten megohms.

Individuals differ widely as to their characteristics of skin resistance, and occasionally a person is found who possesses such a deficiency in the proper functioning of the sweat glands that the skin resistance of the feet, which should not normally be in excess of ½ megohm, may be found greatly in excess of this value. A person of this type in a plant is sometimes found to be responsible for most of the electrostatic fires which occur in a given type of processing — whence comes the dubbed cognomen to these individuals of "hot mammas" or "hot pops." An important and significant factor in this type of potential fire hazard relates the individual's capacitance and grounding resistance by means of a relationship known as the electric "time constant."

Significance of Electric Time Constant

The rate at which a charged condenser may be discharged plays an important role in electrostatic fire hazards, particularly where the ignition originates in the spark energy from the body electrification of individuals. The time required in seconds for a capacitor "C" to discharge to 36% of its maximum charge through a resistance "R" is equal to their product, that is, T = C x R seconds.

The time required for practically full discharge is about three times the above value of the electric time constant. The "time constant" for the conditions both of charging and discharging a capacitor "C" through a resistance "R" is shown graphically in Figure 2, wherein the equivalent electric circuit is also included for reference.

The importance of the time constant in fire hazards may best be illustrated by an example. Assume an individual to have a body capacitance of 100 micro-

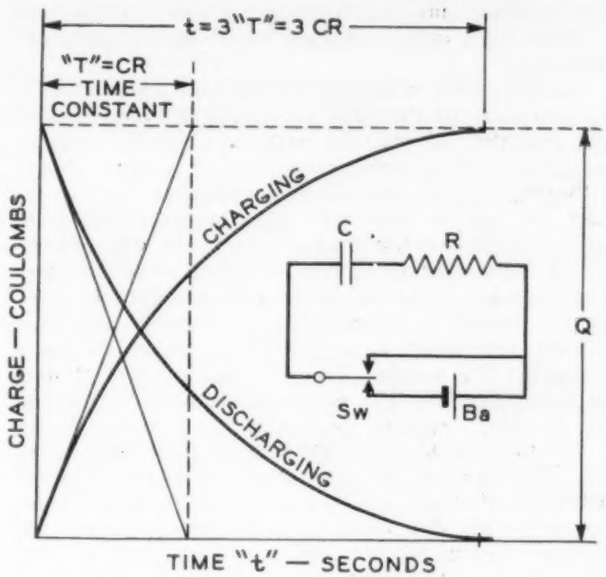

FIG. 2—The time constant "T" in seconds for the electric circuit shown, both for charging and discharging, is numerically equal to the product of "C" and "R." (Illustration, courtesy of "Electrical Engineering").

microfarads and a resistance to ground through rubber soled shoes of 10^{11} ohms and that he is charged to 10,000 volts by walking upon, say, dry concrete. If he rapidly approaches a zone containing a flammable fuel-air mixture, a fire can occur when the individual causes a spark by bringing his hand near a metallic object.

Now let us assume that the floor around this danger zone for a radius of ten feet is grounded in some manner, and that the person, in approaching the danger zone, covers the distance of ten feet on the grounded floor in two seconds. Since the time constant is, numerically, T = C x R seconds, then, based on the above data, his time constant in this instant is 10 seconds, and for him to completely discharge his body would require about 30 seconds. Therefore, the charged individual, in crossing the ten feet of grounded flooring in two seconds, might still retain sufficient electrification to cause ignition from a spark occurring within the hazardous zone at the center.

On the other hand, suppose the resistance of his footwear was of the order of 10^8 ohms, then his time constant would be 0.01 second, and he would fully discharge himself in 0.03 second. In this case, his body would be fully discharged at the instant he took his first step into the grounded area and several feet before he had reached the danger zone. Hence, under these conditions, he would not create the slightest fire hazard. Herein lies the value of knowing and applying correctly, as a factor of safety, the time constant of individuals who operate in or near hazardous zones.

Grounding—A Misconceived Agency

One of the least understood phases of electrostatics in industry is that of grounding. Among the misconceptions as to the effects of grounding is the belief that an accumulation of static electricity cannot occur

in those processing operations where calender trains, band building and tire building machines, metal tops of tables, idler rolls, and other such metallic parts are grounded.

This erroneous belief is predicated on a general misunderstanding of the basic principles of electrostatics. It is true that all machine parts and metallic systems throughout the processing agencies of a plant should be thoroughly and meticulously grounded; but, by so doing, neither the generation nor the accumulation of static electricity on the stock is affected in any manner.

To illustrate the above misconception as to the effect of grounding, consider as an example the ply-stock passing through a calender train, where it runs over an idler roll which is supported by stanchions on a thoroughly dry wooden floor. In making contact with the steel idler roll, the ply-stock acquires its normal, characteristic, negative electrification to the extent, let us say, of developing 50,000 volts with respect to the roll. The complementary positive electricity is generated in the idler roll, and because of its insulation from ground by the dry wooden floor, these charges may likewise develop 50,000 volts with respect to ground. Now, we have two electrified systems, instead of the ply-stock alone, and hence the fire hazards have been multiplied.

The author has seen, on a number of occasions, just such conditions where brilliant sparks, over an inch in length, from an insulated idler roll discharged periodically to ground from the idler stanchions. Because of the high conductivity of the steel stanchions, each spark caused the complete, instantaneous, discharge of all the electricity accumulated on the idler roll system. For this reason, the sparks were so intense that they would, under certain conditions, impart severe shocks to operators.

In consequence, hazards of personal injuries were created, through reflex muscular action, at machines having exposed gearing and belting. These hazards, as well as the potential fire hazards, could be completely eliminated by grounding the systems of idler rolls. When this is done, all of these metallic parts are maintained at ground potential, and therefore, no electric shock from them could occur.

Yet the grounding of the idler roll does not modify, or in any way mitigate, the magnitude of the electrification imparted to the ply-stock; and therefore the voltage of the ply-stock to the idler roll, and to ground, would still persist at the original value of 50,000 volts.

In such operations as the dispensing of flammable solvents, however, grounding does serve in some instances as a mitigating agent. When solvents flow through pipe lines, the solvent acquires negative electricity, in general, and the positive charges acquired by the pipe line are eliminated by their grounding. As the negatively charged solvent is drawn off through nozzles into containers, their potential steadily rises, if they are ungrounded, and an igniting spark at this period could cause grave consequences.

Obviously, if such careless practices are allowed to prevail, most serious fire hazards are introduced. On the other hand, if containers are properly grounded, the volumetric charge of the fluid gradually flows to the container, and thus, to ground.

Meticulous grounding practices are of utmost importance in preserving safe procedures for dispensing flammable liquids. These operations are surcharged with danger in which hazardous conditions exist throughout the entire journey of the flow of solvents from the incoming tank cars at railroad sidings all the way through to the uses of solvents in the individual mixing machines and at the processing units.

TABLE I—PROPERTIES OF FLAMMABLE SOLVENT LIQUIDS *

Flammable Solvent Liquid	Explosive Limits % by Vol. in Air Lower	Explosive Limits % by Vol. in Air Upper	Specific Gravity	Vapor Density Air=1.0	Boiling Point °F.
Acetone	2.15	13.0	0.792	2.00	134
Benzene	1.4	8	0.88	2.77	176
Carbon Disulfide	1.0	50	1.256	2.64	114
Ethyl Acetate	2.18	11.5	0.899	3.04	171
Gasoline	1.3	6	0.75	3–4	100–400
Hexane-n	1.25	6.90	0.661	2.97	156
Isopropyl Alcohol	2.5	....	0.789	2.07	181
Methyl Ethyl Ketone	1.81	11.5	0.805	2.41	176
Naphtha, Safety Solvent	1.1	6.0	<1	...	300–400
Petroleum Ether	1.4	5.9	0.64	2.50	100–160
Toluene	1.27	7.0	0.866	3.14	232

* Lange's Handbook of Chemistry, 1944 Edition, pages 34-57.

Humidification—as a Mitigating Technique

Strangely enough, many an astute industrial manager has been lulled into a false sense of security by the belief that the use of humidification in their operations protected them against all hazards of static electricity. Commonly, the controlled relative humidities range from 50% to 65%.

There have been many fires occurring in processing rooms, particularly on spreaders, even where automatic control has maintained relative humidities within the above range. Generally, these electro-static fires occur on treated stock which is still liberating entrained vapors of flammable solvents.

The author has investigated a number of spreader rooms in various companies wherein it was a common experience for several fires to occur daily during the winter months. One rubber-proofing company estimated that the cost of each fire ranged from $100 to $400, an average cost being about $175 per fire, counting the loss of stock, of carbon dioxide, and of labor outage.

Figure 3 shows where the vapors liberated from the rubber cement on spreaders accumulate near the wind-up, on the floor, because the volatile components are from two to four times heavier than air. Also, vapors are shown to collect above the stock, after the doctor knife, where they volatilize from the cement by virtue of the high temperatures created by the steam driers. The occurrence of a single spark, only, is necessary to ignite these fuel-air mixtures, provided that the spark possesses heat energy in excess of the threshold value for ignition and that the fuel-air mixture, where the spark occurs, is within the explosive range. The properties of some of the solvent liquids commonly used in the rubber industry are included for reference in Table I.

The sole purpose of humidification in the rubber industry is to mitigate static electricity; from all other aspects, applied humidity is detrimental to the stock. When it is properly applied, a film of water vapor condenses on the surface of processed stock, rendering it partially conductive, whereby the generated charges gradually drain off to ground. The unrolling of the stock even in a highly humidified room does not always permit sufficient time for the condensation of water vapor from the humidified air to render the stock

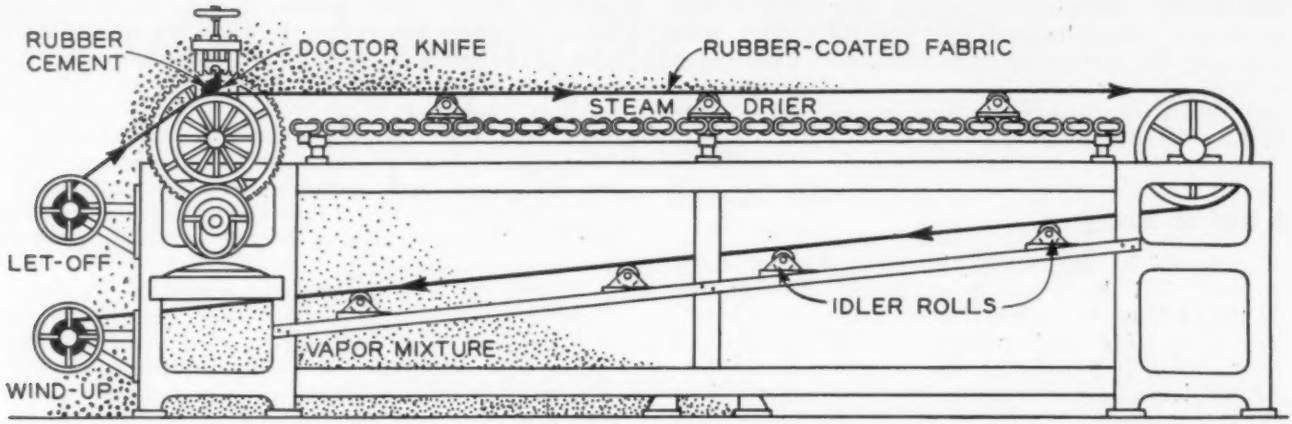

FIG. 3—This typical rubber-spreading machine shows the indicated accumulations of flammable solvent vapor on the floor and above the stock where it creates serious fire hazards in proximity to the highly electrified coated fabric after the doctor knife and near the wind-up reel. (Illustration, courtesy of "Electrical Engineering").

adequately conductive to ground the electric charges.

In certain operations within the rubber industry, the author has effected direct savings per annum of large sums of money to his client by eliminating the use of humidification. As indirect benefits from this, other appreciable economic returns materialize through the saving of costly products, mainly tires, from "reclaim."

It is generally known throughout the rubber industry that fabric or cord in absorbing water vapor leads to a loss of adhesion between plies by the generation of steam and the formation of gas blisters during the final curing stage—a condition which sometimes results in the separation of the plies and the release of the beads, under high tension, in the inflated tire carcass. Such losses can, and should, be eliminated.

If humidification was the only means, and a satisfactory one, for the dissipation of static electricity, its continued use could be condoned. In this event, the relative humidity as employed in most processing rooms should be considerably increased to circumscribe effective limits, even despite the enervating experience of working under such unpleasant conditions. However, the use of high relative humidities, values considerably above those of the natural ambient atmosphere, is entirely unnecessary and unwarranted.

By the employment of proper mitigating means, applied humidities should be abandoned in many operations where they are now commonly employed. This would shower immediate benefactions upon employees by improving their working conditions, and upon management by realizing appreciable savings in annual operating expenditures.

Electrostatic Mitigation

In operations where stock is run through the various types of processing machines, the electrification of the stock occurs from its contact with the moving elements. The fire hazards appear as a result of the high energy sparks occurring concurrently with the presence of flammable fuel-air mixtures, which latter may either be entrained in the rubber-coated stock or liberated in tackifying operations.

Since the solvents are essential to the processing of the rubber stock, the mitigating efforts must then be directed essentially toward the control of the electrification. In all cases of mitigation, the devices which are employed for accomplishing this utilize the principle of ionization of the ambient atmosphere.

As air molecules are ionized by these mitigating devices, near the surfaces of the stock, the positive ions are strongly attracted to the negative charges residing on the stock, and the negative ions are repelled to remote distances from the stock. Whether or not complete neutralization of the charged stock occurs depends upon the supply of ions which is created in the closely surrounding atmosphere.

Many means are known for producing ionization of the air molecules, among which are:

1—bombardment by X-rays;
2—radiation of ultra-violet energy;
3—emanation from radio active substances;
4—heat of combustion; and,
5—energy from high-voltage electric fields.

Obviously, the high expense, or the inconvenience of cumbersome equipment, associated with the use of X-rays, ultra-violet radiation, or radio-active materials, prohibit their use in industrial services. Although the use of gas flames has been tolerated for decades in the paper industry as an anti-static agency, by nature it could not be employed in the rubber industry. Hence, those methods which utilize high-voltage electric fields have found most extensive application in controlling electrification in industrial operations. Many forms of high-voltage ionizers have been developed for the control of static electricity.

Most of these anti-static, high-voltage agencies utilize voltages of the order of 12,000 to 30,000 volts, employing either alternating current or rectified unidirectional current to energize the ionizing devices. The high voltage is applied between ionizing bars and ground, with the ionizing bars placed over and across the stock. The operation of these devices entails the use of high-voltage transformers, either alone or in conjunction with mechanical or electronic rectifiers. These ionizing units are relatively complicated and expensive, costing in many cases from $150 to $300. It is interesting to note that costly equipment of this type has gained little or no favor among the rubber companies—a commentary largely associated with its high cost.

Since ionization of the air is required near the stock

and directly following its passage over each of the processing rolls, wherever these zones are made hazardous by the presence of flammable vapor, such equipment as calender trains, bias cutters, tackifying units, and rubber film machinery require on each a multiplicity of such ionizing units.

A Word of Warning

It should be emphasized that these ionizing units do not fulfill the needs for mitigating electrification on tire-building units, belt-building tables, band-building cutting tables, and on many other such specialized units. Also, it should be mentioned that these high-voltage devices are denounced, by safety organizations and by insurance interests, for use in post-dip and pre-dip driers, in the driers of spreading machines, and in other enclosures which contain flammable vapors, as they introduce potential explosion hazards of their own.

Expensive ionizing units of these types, together with their inherent, high-voltage, ignition hazards, have not curried favor with the heads of production departments, in addition to the above reasons, because of the latent physical dangers to operators should these heavy units be torn from their supports and thrown violently about, when stock winds around rolls, or breaks, under certain improper operating conditions, particularly in calender trains.

In order to meet the exacting requirements of the rubber industry, the author has devised and patented certain simple, inexpensive means for the ionization of air molecules to neutralize charged stock. He has utilized a relatively low and safe voltage from the stock itself, directly after the processing roll. The units are light in weight, and low in cost, and they have the advantage of utilizing no transformers or rectifying devices; also, they are not attached to the electric power or lighting system of the plant. Should damage, or clogging, or roll-wrapping of the stock occur, no serious injury to employees can result from breakage of these ionizing units.

Ionizing units of this type can be readily installed, under expert supervision quickly and conveniently. Also, they are of such a nature that the units can be located well away from contact with the stock. But should inadvertent contact be made with the stock through faulty operation of the stock processing equipment, even the most delicate surfaces would suffer no blemishes. It is particularly important that there can be no reluctance either on the part of management or of interested insurance or safety groups against the installation of these ionizing devices in driers and ovens, or in other enclosures where flammable fuel-air mixtures are prevalent.

Quantitative Survey Necessary

During the past year, the author has been serving two of America's largest rubber companies in conducting comprehensive investigations of their electrostatic problems and in mitigating their electrostatic fire and explosion hazards. He has been gratified with the manner in which his methods of approach to these problems and his mitigating agencies have been received by management.

From his additional experience acquired by serving these industries, he is even the more firmly convinced that all problems on electrostatic hazards can be approached with assurance of ultimate solution, but only by first conducting a comprehensive quantitative survey. Such tests provide information upon which a thorough analysis of the elements of each problem can be based, and, therefrom, an adequate, tailor made, solution can be subsequently developed which fits best the idiosyncrasies of the particular application under investigation.

In order to ascertain the achievement of the objectives of these methods of electrostatic control, and, as a conclusion to the particular studies after the mitigating equipment has been positioned on the machinery, final quantitative tests are then applied. Minor adjustments, at this stage, constitute the "final fitting" of the tailor-made equipment and its subsidiary means, all to render best possible results in accordance with the predetermined specifications.

Conclusions

From the information presented in this paper, certain important conclusions have been drawn so that they may be left with the reader for his reflection and consideration. These conclusions are that:

1—All electrostatic fire and explosion hazards throughout the rubber industry can be mitigated and controlled to the extent of their virtual elimination.

2—In undertaking a program for controlling electrostatic hazards, success can be anticipated only in proportion as management gives its continued blessing, including both a sincere interest in following the progress of the project and a provision for arranging adequate appropriations for its support.

3—An electrostatic survey for the purpose of controlling electrostatic fires and explosions requires a thorough quantitative study of each hazardous operation throughout the plant.

4—The interpretation of the test data from such a survey, in addition to making the proper types of tests, require not only an exact knowledge of the laws of electrostatics as they apply to the rubber industry, but also, an extensive experience in understanding the apparent vagaries and the obscure characteristics of electrification.

5—No palliatives or proprietary "cure-alls" for general application to the electrostatic ills of industry can be applied with any better prospects for success, here, than in trying to cure human ills without the scientific methods of the experienced physician in the use of his techniques of diagnosis, analysis, and prescription.

6—By applying scientific means for adequately controlling electrostatic hazards, many industrial processes can be speeded up, production increased, costly spoilage reduced, needless humidification eliminated, and production costs and operating expenditures materially reduced, as well as dispelling the "jittery nerves" and the disquietude of operators.

7—The costs of a comprehensive survey of electrostatic fire and explosion hazards, in rubber plants, and of the application of various types of mitigating agencies, are insignificantly small in comparison with the direct and indirect annual savings which can be realized by the individual companies.

Acetylene Black in Rubber

By G. BENSON

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SOME ACCOUNT has appeared in the literature dealing specifically with the electrical properties of natural or synthetic rubber containing acetylene black *(1)*. Other physical properties of the compounds have been recorded as part of studies of various types of carbon black, but with increasing interest being shown in a material whose properties are, generally speaking, out of line with those of other blacks *(2, 3, 4, 5)*, it seemed desirable to summarize in one paper the work which has already appeared, together with some hitherto unreported results.

At the outset it should be emphasized that acetylene blacks may vary in properties according to their method of manufacture as much as any other black made from one raw material, and that all results recorded here, unless specifically stated to the contrary, deal with one commercial type of acetylene black made by a thermal process.

Acetylene black was first made by Berthelot in 1881 by dissociation of acetylene into carbon and hydrogen, but the first method attempted for the commercial production seems to have been a channel process. This gives a material which is very fine and hence intensely black and comparable with the usual color blacks. The low yields however make the cost prohibitive and, as far as is known, no acetylene black made by this process is available commercially.

A second method of production utilizes the fact that under pressures of more than two atmospheres, acetylene breaks down into carbon and hydrogen if the decomposition is initiated by suitable means such as an electric spark. There are considerable hazards and mechanical difficulties with this process but it has been operated to some extent in Germany *(6)*.

A third method which seems to have found no extensive commercial application on this continent is the decomposition of acetylene formed from methane or other gases in the electric arc, such as the process employed by Germany at Huls during the war, in which a certain amount of by-product carbon is formed which can be designated an acetylene black.

The fourth method, that used at Shawinigan, depends on the thermal decomposition of acetylene at temperatures above about 800°. The reaction being strongly exothermic, pyrolysis may be maintained without any external source of heat. Briefly, acetylene gas, pure or mixed with other gas, is passed through a cooled inlet pipe into a refractory-lined retort which is first heated to the required dissociation temperature by burning the acetylene as it is introduced. Once this temperature is reached, burning is discontinued and the acetylene is allowed to continue to flow into the retort in the absence of air or mixed with small amounts of air. Smooth decomposition occurs, flakes or flocculent black appear at the base of the retort where the hydrogen may be burned with air admitted there or may be separated from the black without combustion. The separated black is conveyed to presses where it is compressed to varying degrees for shipment *(7)*.

Note: This article is based upon a talk given by the author before the Ontario Rubber Group at Toronto, Canada, on October 25, 1945.

General Properties of Shawinigan Black

In Table I a comparison is made of the properties of Shawinigan Black with other acetylene blacks.

Figures 1 to 15 are recent electron microphotographs taken with an R.C.A. universal instrument. In some of these, instead of catching particles on a film stretched over the 200 mesh screen of the specimen holder, fine glass fibres were first of all attached across the screen and then the black blown across the tangled fibres so that the black caught has no film background to detract from the definition.

It will be seen that while all acetylene blacks show

TABLE I

Type of Black	App. Density (lb./c.f.)	Compressibility (lb./cu. ft. at 1500 psi.)	Electrical Resistivity (ohm-in.* at 44 lb./c.f.)	A.S. Value *	Nigrometer Value	Mean Particle Size mμ †	Surface Area † (Acres/lb.)	% Volatile	Ether Extract	% Ash	pH
Shawinigan Black (50% Compressed).....	6.25	32	0.03	30	93	50	7.0	0.05	0.02	0.04	9.0
Shawinigan Black (100% Compressed)....	12.5	32	0.03	25	93	50	7.0	0.05	0.02	0.04	9.0
Acetylene Black (Channel Process).....	4.7	31	0.10	23	69	12	28	3.0	1.5	0.06	4.0
Acetylene Black (Explosion Process).....	4.2	43	0.09	26	92	45	7.5	0.9	0.05	0.03	5.0
Acetylene Black (Electric Arc).....	28	54	195	5.0	79	20	17	3.8	14	0.7	6.0

* Absorption-Stiffness Test. cc. liquid which will form one coherent ball with 5 grams black.
† From electron microscope measurements.

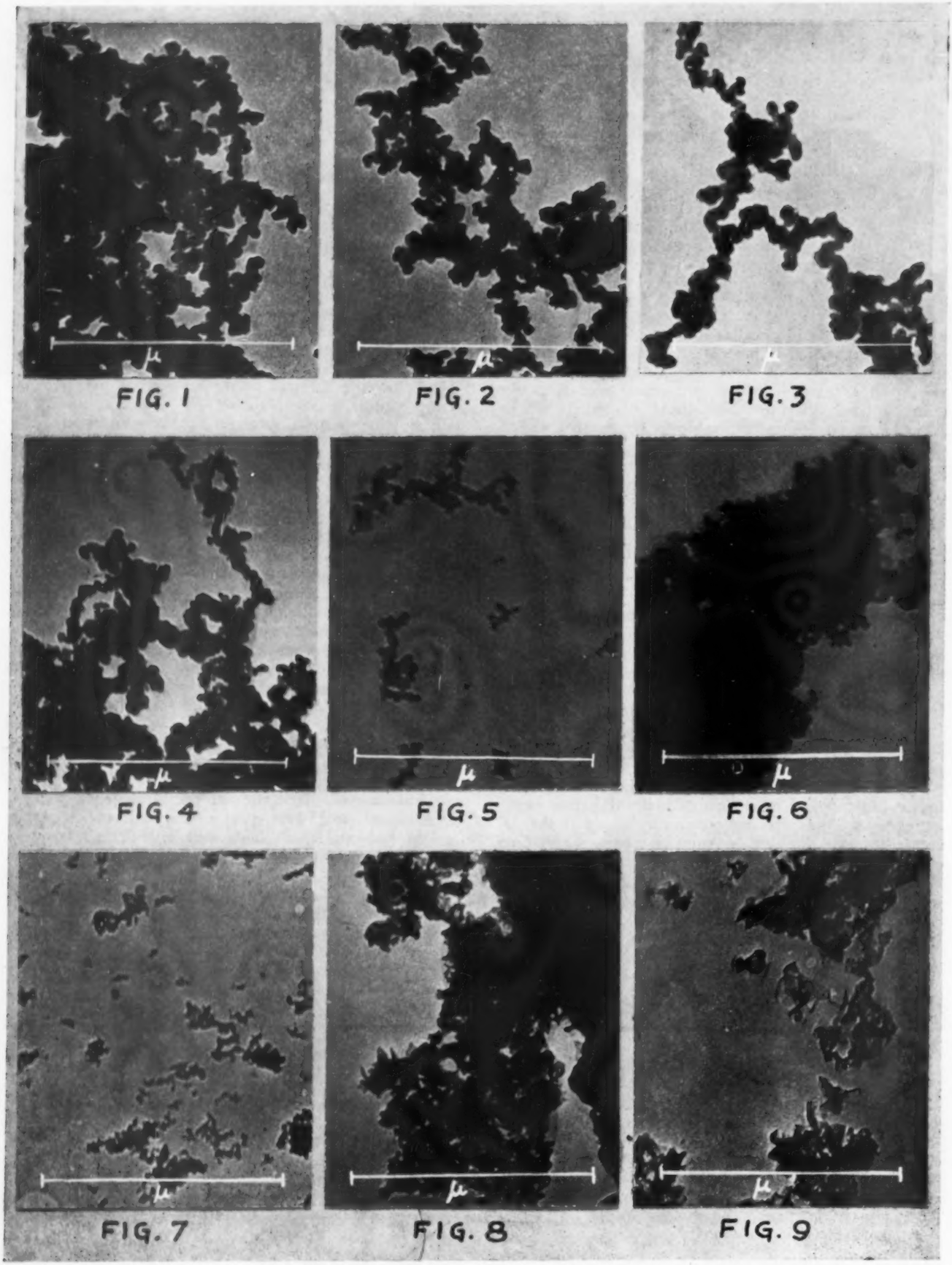

FIG. 1—Shawinigan Black, filmless; FIG. 2—Shawinigan Black filmless; FIG. 3—Shawinigan Black, film; FIG. 4—Acetylene, Explosion, filmless; FIG. 5—Acetylene, Explosion, film; FIG. 6—Acetylene Color Black, filmless; FIG. 7—Acetylene Color Black, film; FIG. 8—Arc Acetylene Black, filmless; FIG. 9—Arc Acetylene Black, film.

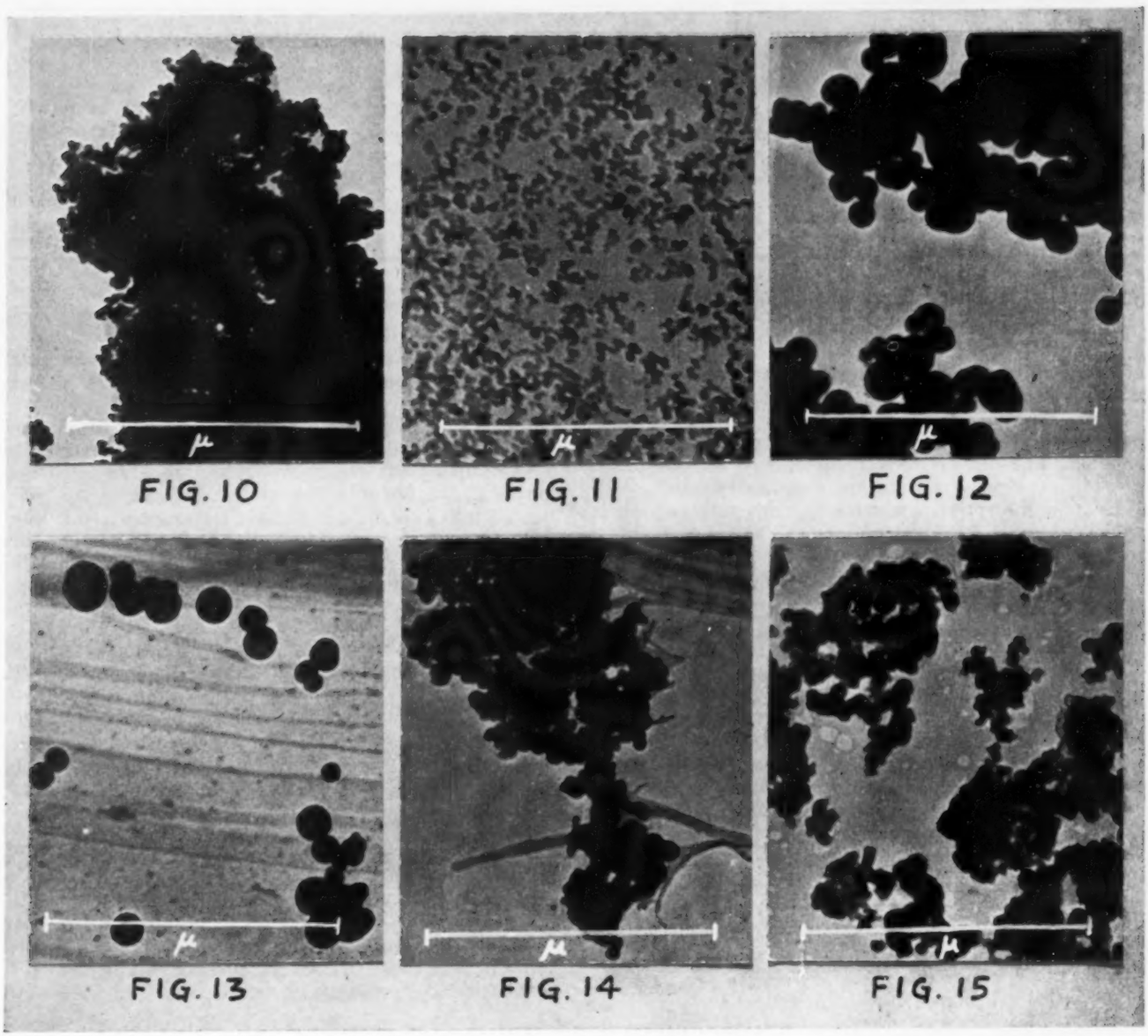

FIG. 10—Vultex (Channel), filmless; FIG. 11—Vultex (Channel), film; FIG. 12—P-33 (Fine Thermal), filmless; FIG. 13—P-33 (Fine Thermal), film; FIG. 14—Statex (Furnace), filmless; FIG. 15—Statex (Furnace), film.

some tendency towards chain formation, in Shawinigan black it is especially pronounced.

X-ray diffraction studies have been made and indicate an approach to a graphite structure *(8, 9)*. In graphite, layers of carbon atoms are superimposed exactly one above each other, whereas in carbon blacks the layers are displaced into what Biscoe and Warren call turbostratic layers. In acetylene black there is closer approach to the orderliness of the graphite crystal than in the so-called amorphous blacks. From a study of diffraction patterns it is also possible to calculate dimensions of the crystallites. In Shawinigan black these are *(8)*:

$$a = 2.42\ \text{Å}$$
$$L_c = 21.4$$
$$L_a = 31.2$$
$$C = 7.0$$

giving a crystallite volume of about 4.5 $m\mu^3$.

Uses of Shawinigan Black

Although the development of the Shawinigan process has coincided roughly with the growth of the use of black in rubber, this is quite fortuitous, since an overwhelming proportion of the production has been used in the manufacture of dry cells.

The use of acetylene black in dry cells was suggested as early as 1903 but it was not until more than twenty years later that its value began to be appreciated. From then on there was a rapid increase in its use as a replacement for graphite *(10)*. The black imparts to the batteries higher operating voltages, higher flash currents, longer shelf life and, above all, higher capacity. This effect is especially pronounced in the smaller sized cells.

The main function of black in batteries is to provide an electrically conductive network throughout the mix-

TABLE II—THERMAL CONDUCTIVITY OF NATURAL RUBBER STOCKS

Kind of Black	Parts Black	Thermal Conductivity (BTU/hr./sq. ft./°F./in.)
Shawinigan Standard	10	1.16
Shawinigan Standard	30	1.74
Shawinigan Standard	50	2.34
Shawinigan Standard	50	2.12
Shawinigan Standard	50	2.26
Micronex W-6	50	1.30
Kosmos 40	50	1.47

ture. Each and every particle of manganese dioxide must be in electrical contact with the carbon electrode in order to accomplish its function and any particle not thus connected represents unnecessary bulk in the battery. Shawinigan black being highly conductive and possessing a chain-like structure and great bulk provides this bridging between the manganese dioxide particles of the depolarizer and the carbon electrode.

Its high absorptive power for liquids enables the depolarizing mass to retain a sufficient amount of electrolyte to insure a long service life of the battery.

Acetylene Black in Natural Rubber

The principal application of acetylene black in rubber has been to make materials which are highly conductive electrically. This appears to be well known, has been the subject of a recent paper *(11)* and therefore will not further be dealt with here.

A property that might be expected to follow electrical conductivity is heat conductivity. Table II shows that the conductivity of rubber containing Shawinigan black is about twice that of the rubber with other blacks used for comparison.

The tensile properties are summarized in Table III.

TABLE III

Smoked Sheet	100.00
Zinc Oxide	5.00
Sulfur	2.75
Stearic Acid	1.00
Captax	0.80
Pine Tar	0.40
Shawinigan Black	Variable

Cure at 274°

Black Loading	20	35	50
Plasticity (Williams) 1/100 mm.	212	252	316
Mooney Viscosity	16.5	23.2	42
Tensile at Room Temp., 15 min. cure	2100	1630	2050
25 min. cure	3080	3000	2960
35 min. cure	3190	2900	2130
45 min. cure	3180	3450	3020
90 min. cure	3340	3310	3000
Tensile at 212° F., 15 min. cure	1460	1250	1430
25 min. cure	1920	2090	1850
35 min. cure	2090	1890	2010
45 min. cure	2140	2170	2180
90 min. cure	1600	2030	2100
Modulus at 300%, 45 min. cure	570	1070	1750
Elongation at Break, %	680	625	480
Set at Break, %	28	56	34
Shore Hardness	47	56	66
Tear Resistance	280	565	620
Resilience (Goodyear-Healy), %	81	75.2	67.3
Rebound (Lupke), %	85	84	77
Abrasion Resistance (Dupont), cc. loss/H.P. hour	399	212	121
Heat Build Up, °F. (Goodrich Flexometer)	27	29	51
Heat Build Up, % Set	1	1	2
De Mattia Bend. Flex., 0.01"/144,000 cycles	5	4.5	9
Log Electrical Resistance, Ohm/cm³	7.1	2.9	2.2
Torsional Hysteresis, K	.10	.19	.28

TABLE IV

Parts Black	20	30	50
Modulus at 300%			
Shawinigan	540	1030	1820
Philblack A	450	1290	1920
Statex 93	450	910	1570
Modulus at 500%			
Shawinigan	1510	2480	3030
Philblack A	1330	2840	....
Statex 93	1350	2350	3070

In general it will be seen that the black resembles an HMF with a higher modulus, higher hardness, higher heat build-up and slightly lower tensile than is normal to its particle size, but with rather better abrasion resistance and cut growth resistance. These properties seem consistent with the high degree of structure shown up by the electron photographs. On a purely physical theory of structure reinforcement, as presented by Guth *(12)*, the chain structure of acetylene black introduces a shape factor which will give an abnormally high modulus at low loadings but which will affect the modulus less at high loadings. This is shown in Table IV where the acetylene black is compared with two HMF blacks.

Drogin *(13)* in a comparison of Kosmobile 77, acetylene black, Kosmos 20 and Lampblack B-5, at loadings of 60 parts black gives the highest plasticity (305—Williams at 7.0), the highest modulus at 300% (2025), the lowest elongation at break, the highest heat build-up, and the smallest abrasion loss to the acetylene black. In other properties it is intermediate between the EPC and the SRF black. These results are consistent with those given in Table III.

Acetylene Black in GR-S

Apart from its high electrical conductivity and improved heat conductivity, Shawinigan Black in GR-S seems to have properties between those of HMF and

TABLE V

GR-S	100.0
Zinc Oxide	5.0
Sulfur	2.0
Captax	1.5
B.R.T. No. 7	5.0
Shawinigan Black	Variable

Cure at 292° F.

Black Loading	35	50
Plasticity (Williams) 1/100 mm.	351	384
Mooney Viscosity	44.7	58
Tensile at Room Temp., 25 min. cure	1300	1370
50 min. cure	1570	1940
90 min. cure	1520	1940
Tensile at 212° F., 25 min. cure	690	940
50 min. cure	820	1230
90 min. cure	780	1160
Modulus at 300%, 50 min. cure	780	1140
Elongation at Break, %	553	537
Set at Break, %	25	24
Shore Hardness	52	59
Tear Resistance	210	300
Resilience (Goodyear-Healy)	57	54
Rebound (Lupke)	74	70
Abrasion Resistance (Dupont), cc. loss/H.P. hour	211	108
Heat Build Up, °F. (Goodrich Flexometer)	85	97
De Mattia Bend Flex.	22	27
Log Electrical Resistance, Ohms/cm³	12	5.5
Torsional Hysteresis, K	.22	.36

EPC blacks. Abrasion loss is noticeably low both in the results given in Table V and in the work recorded by Drogin.

Acetylene Black in Buna N

In the comparison made by Drogin, acetylene black shows an exceptionally high extrusion value (Firestone Dillon) and the lowest abrasion loss. At a loading of 50 parts of Shawinigan Black we obtained a thermal conductivity of 2.48 B.T.U. °F./sq. ft./hr./in.

Acetylene Black in GR-I

Measurements which have been made in GR-I are summarized in Table VI. Drogin reports low abrasion loss.

Shawinigan Black seems to be exceptional in the reduction of hot flow in this rubber. Tests were made which consisted in stretching ¼" A.S.T.M. dumbell samples under a tension of 1.0 lb. for 48 hours at 100° C. The results are shown in Table VII, the hot flow being expressed as the percentage increase in length on release of the tension.

X-ray diffraction studies have been made of GR-I and they indicate that the size of the GR-I crystallites which form on stretching are influenced by the size of particle of the black filler used. Apart from that, the degree of orientation of the GR-I crystallites is influenced by the nature of the black, and of the four blacks tested this is greatest with Micronex and Statex and least with P-33 and Shawinigan.

Poor orientation may be due to poor bonding between the black and the rubber or to the chain or agglomerate nature of the black causing the rubber crystallites to be pulled out of line when there is good bonding between the black and the rubber. It is suggested that the second alternative is more likely with the Shawinigan Black and that the reduced orientation may be a factor in the reduced hot flow.

ACKNOWLEDGMENT

Thanks are due to T. R. Griffith of the National Research Laboratories, Ottawa, for advice, and to the V. L. Smithers Laboratories, Akron, and R. H. Hall, B. P. Buckley and J. H. L. Watson, of Shawinigan Chemicals, Limited, who carried out the experimental work.

TABLE VI

Butyl Rubber (GR-I)	100.0
Zinc Oxide	5.0
Stearic Acid	3.0
Sulfur	2.0
Tuads	1.0
Mercaptobenzothiazole	0.5
Shawinigan Black	Variable

Shawinigan Black Loadings	10	30	50	70
Plasticity (Williams-DuPont), at 85° C. 1/100 mm.	220	240	355	465
Modulus at 300% *	260	420	760	1080
Tensile Strength *	2740	2100	1715	1330
Elongation at Break *	750	625	590	470
Shore Hardness *	36	49	58	69
Tear Resistance †	97	164	252	310
Rebound (Lupke) *	15.5	12.5	11.5	11.5
Electrical Resistance (Ohms-cm.)	10^{13}	250	20	11

* Cured at 307° F. giving maximum tensile, 40 min.
† Cured at 307° F., 60 min.

TABLE VII

Percentage Hot Flow of Standard (ASTM) Samples of Butyl Rubber (GR-I) in 48 hours at 100° C. under 1.0 lb. Tension
(Cured at 307° F.)

Parts of Black	Shawinigan Black		Micronex		Statex "A"		P-33	
	40 m. Cure	120 m. Cure	40 m. Cure	120 m. Cure	40 m. Cure	120 m. Cure	40 m. Cure	120 m. Cure
30	59	40	64	44	67	47	98	51
50	33	21	45	30	50	32	73	38
70	21	11	29	21	37	19	43	28

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Soap in Newer Synthetic Processes

WHILE new processes for making synthetic rubber by emulsion polymerization methods are still being found, soap continues to serve as a standard ingredient. Two recent patents (U. S. Pats. 2,378,693 and 2,378,695), both granted to C. F. Fryling, are primarily concerned with methods of coagulating synthetic rubber latices. In one instance, a stable aqueous polymer dispersion, prepared by polymerizing butadiene —1, 3 with a copolymerizable monomer in the presence of a water-soluble soap as the emulsifying agent, is coagulated by mixing this dispersion with an aqueous solution of an aluminum salt. With such a method of coagulation, discrete, substantially non-coherent particles of rubbery materials are formed.

In the second patent, synthetic latex is formed by the emulsion polymerization of a member of the class of compounds consisting of butadiene —1, 3; isoprene; piperylene; 2, 3 dimethylbutadiene —1, 3 and chloroprene, in the presence of a water-soluble fatty acid soap. Coagulation of such materials proceeds in several steps. First a layer of fatty acid soap is salted upon the particles of synthetic rubber in the synthetic latex. Then the soap-containing particles are acidified to liberate fatty acid from the soap whereby the particles grow into crumbs of the desired size.

Another patent (U. S. Pat. 2,378,732) granted to W. L. Semon and C. F. Fryling describes a method of producing synthetic rubber by polymerizing a mixture of butadiene and acrylonitrile in an aqueous emulsion containing a fatty acid soap. The resulting latex is coagulated with dilute sulfuric acid and the coagulated synthetic latex is then extracted with an aqueous solution of sodium hydroxide.

Biochemistry of Rubber Formation in Plants

THE biochemistry of rubber formation in plants has long occupied the attention of scientists. An excellent summary of findings to date was given in a talk by Dr. James Bonner, Associate Professor of Plant Physiology at the California Institute of Technology, before the Southern California Section of the American Chemical Society on December 7, 1945. An abstract of the talk follows:

The formation of rubber appears to be a quantitative rather than a qualitative character of plants. Some species contain no rubber, in some, rubber is a major constituent (22% or more on a dry weight basis in guayule), and we find all possible intermediates. Only a few species produce rubber in sufficiently large quantities and in sufficiently pure form to be considered as even potential commercial producers.

Rubber Forming Capacity Differs

Rubber formation is a property scattered through numerous families of the plant kingdom in no discernably regular fashion. The *Moraceae, Euphorbiaceae, Apocynaceae, Asclepiadaceae,* and *Compositae* tend to be particularly richly represented in rubber forming species. All of the genera within one family are not ordinarily rubber forming and the species of one genus may differ greatly in rubber forming capacity. Certain rules as to the distribution of rubber have emerged. Rubber formation is confined to the dicotyledonous branch of the angiosperms and is not found in monocotyledonous plants, in gymnosperms, or in lower plants.

The great majority of rubber forming species are tropical. Within a single genus, the tropical representative may include numerous species which accumulate considerable amounts of rubber, whereas the representative of this same genus in the temperate zone form little or no rubber. Temperate zone species which form sufficient rubber to be considered as potential rubber sources are few and include only *Parthenium argentatum, Taraxacum kok-saghyz* and its allies, and perhaps *Ascepias* species, as *erosa.* Although the great majority of the more common species have been investigated, still it should not be forgotten that the discovery of *Taraxacum kok-saghyz* in the remote Tien Shan mountains of Russian Central Asia occurred as recently as 1931.

With but a few exceptions (such as goldenrod), rubber is accumuated in the form of latex. This latex is produced and accumulated in general in specialized latex vessels, especially by those vessels which occur in the bark although in a few cases, as in guayule, the production and accumulation of latex takes place within the cells of the parenchymatous tissues. In occasional cases also the principal rubber accumulation may be in the leaves. Rubber production by the latex system of the bark is most important from an economic standpoint. The production and accumulation of rubber differs, from an anatomical standpoint, from that of the related mono and sesqui terpenes, which are generally produced in cells or glands at or near the surface of leaves or bark or adjacent intercellular ducts or spaces.

Rubber and the other higher terpenes do not appear to be able to move out of the living cells in which they are synthesized and no evidence for the movement of rubber from cell to cell has been adduced. Rubber once laid down appears to remain *in situ* indefinitely. The lower terpenes on the contrary do move readily out of the cell in which they are produced, and frequently even escape to the outside air.

Rubber deposition takes place most vigorously in mature tissues. Thus seedling guayule plants accumulate a smaller proportion of rubber than do older plants under identical conditions, while in kok-saghyz rubber formation occurs principally in the mature root.

As to the role of rubber, the suggestion that latex serves to protect the plant against attacks from herbivorous animals has been disproved by numerous observations, such as the fact that kok and tau saghyz roots may suffer severely from insect damage. The evidence available at the present time indicates however that rubber once deposited by the plant is practically immobilized and probably is not available as a reserve food. That enzymes capable of bringing about rubber breakdown must exist is shown by the fact that rubber is attacked by many micro-organisms. The breakdown of rubber through the agency of enzymes from higher plants has however never been achieved.

With the possible exception of a role as a secondary reserve food, no physiological function of rubber in the plant has as yet been found. It seems possible that this material is to be considered as an excretion product or a non-functional by-product of cellular metabolism. A similar view in the case of the mono and sesqui terpenes seems all the more reasonable in view of the large amounts of these materials which are lost to the atmosphere and are hence lost so far as further metabolic usefulness is concerned. Neither is any physiological function known for the triterpenes of their derivatives. Frey-Wyssling considers it probable that a portion of the carotenoids (tetraterpene derivatives) may also represent functionless metabolic by-products.

Rubber May Be Synthesized

In certain plants rubber may be synthesized as an alternative to the formation of other less highly polymerized products. In the case of guayule, environmental factors appear to direct the metabolism either toward mono and sesqui terpenes or, under other conditions, toward rubber. In *Cryptostegia* genetic factors determine whether rubber synthesis or the synthesis of a triterpene alcohol shall predominate. This evidence suggests that there may be a single terpene precursor which may be polymerized in various ways depending on the conditions prevailing in the particular plant. This view is strengthened by the fact that all terpenes, from the simple mono terpene to rubber and gutta, can be regarded chemically as derived from a single 5-carbon branched chain skeleton, and compounds of the nature of the isovaleric aldehyde, angelic aldehyde and tiglic aldehyde have been suggested as possibly related to the precursor.

Numerous other possibilities may also be envisaged, however, and in the absence of any factual material derived from actual experiment only guesses can be made as to the nature of this precursor of rubber.

Advances in Rubber During 1945

By ERNEST CHILTON

Firestone Industrial Products Co., Akron, Ohio

THE end of the war has seen the rubber industry come through with flying colors *(1, 2)*. Although hit harder than most other industries by shortages in its main raw materials, it has solved the problem by the creation of the synthetic rubber plants whose gigantic production capacity becomes evident only now when compared to the enemies' efforts that extended over a much longer period of time. We can look with pride on a production record of 737,000 tons of GR-S in the year 1944, while the German figure never reached more than 120,000 tons in any similar period *(3)*.

GR-S Mainstay of Synthetic Program

GR-S was still the mainstay of the synthetic program and much effort was spent to improve its properties and processing qualities *(4-8)*. Although much can be gained by proper handling, the question is still one of compromise between ease of processing and good physical properties of the vulcanizate. One of the most promising of the synthetics is Butyl (GR-I), which has found increasing use in the industry *(9, 10)*. An ideal material for inner tubes because of its low permeability to gases, almost the entire war-time production was taken up for this purpose by the Armed Forces *(11)*. Its high hysteresis and great resistance to some oils also make it a useful synthetic for many types of mechanical goods. Few new developments were noted for the other special-purpose synthetics, such as Neoprene, Buna N and Thiokol, but comparisons of their production and properties with those of GR-S, Butyl and natural rubber appeared in the literature *(12, 13)*.

Several investigators reported new synthetic rubbers, but most of these inventions are still in the laboratory stage *(14-16)*. Some of the most talked-about new products are those made from silicone resins. Unaffected by temperatures as high as 450°F. and as low as —70°F., they have already proved very effective as gasket materials in airplane engines, as bases for heat and cold-resistant oils, and in other products *(17-20)*.

As the borderline between synthetic rubber and plastics becomes ever narrower, many of the manufacturers are making use of their laboratories and processing equipment to manufacture plastic products *(21, 22)*. In fact, an all-plastic tire has been produced and, although no complete reports are available, it is supposed to show some promise *(23)*.

The saying goes that "necessity is the mother of invention," and that applies to nothing better than the tremendous advances made in the reclaiming processes *(24-26)*. Neglected for many years while crude rubber was plentiful, the industry has proved a vital contribution to the war effort. Much work has been done to improve the process *(27)* and reclaim from synthetic stocks has even proved valuable as an extender for raw rubber *(28, 29)*. The main difficulties encountered are those of sorting the scrap as to the different types of rubber and synthetic, for each type requires a different reclaiming method.

In spite of the advances in synthetics, a certain percentage of crude rubber is still needed for tire production and the manufacture of some other products. Some of this requirement was filled by the stock pile available, some through shipments from Ceylon, South America *(30)* and Africa, and some from the continued attempt to extract rubber from plants other than the *Hevea brasiliensis*, the original rubber tree. While some courageous men have braved the wilds of the African and Central American jungles to tap wild rubber *(31, 32)*, the Department of Agriculture has conducted experiments in guayule, cryptostegia grandiflora, goldenrod, dandelion, and castilloa *(33-36)*. Although many of these "home-grown" rubbers have qualities approaching those of Hevea, they can hardly compare with the cost of peace-time Hevea rubber. Despite the war, the British have continued their research facilities in Ceylon and have formulated plans for the rehabilitation of the Malayan rubber-growing areas *(37-39)*. Even Brazil, where rubber originated, intends to re-capture some of its rubber trade and has built a research organization under the guidance of the United States to study the problems involved *(40-41)*.

Chemical Developments Numerous

In line with the development of synthetic rubber and plastics, the chemical industry has continued to produce processing materials and the laboratories have kept step by evaluating their properties. Since process-hardening is one of the greatest drawbacks of GR-S, the line of plasticizers and softeners is ever growing *(42-44)*. As their number must by now reach into the hundreds, it is worth referring to a summary paper giving the characteristics of the various groups of these chemicals *(45)*. A similar summary was prepared by the same authors for extenders *(46)*, of which there was also a number of new types. Vulcanizing agents *(47)*, peptizers *(48)* and accelerator activators *(49, 50)* were some of the other new chemicals offered.

In the last year, the importance of reinforcing carbon black has induced a great deal of research, the accent lying mainly on the size and dispersion of the black particles in the rubber *(51-54)* and the thermal and electric conductivity imparted to the mixture *(55, 56)*. It has been possible to produce an electrically-conductive rubber in which the carbon is dispersed to form a continuous chain and this is being used for non-static conveyor belts, for airplane propeller de-icers *(57,*

Note: This annual report was presented before the Rubber and Plastics Division of the American Society of Mechanical Engineers at the meeting held in New York City on November 27, 1945.

58), and for tires, tracks and bogie wheels on radio-equipped vehicles. There have also appeared several reinforcing agents other than black, particularly for vari-colored products *(59, 60)*.

Developments in Physical Testing

Presented with a profusion of available compounding ingredients, the compounder must rely on physical tests to determine the best combination to arrive at the properties required by the finished product *(61)*. The standard tests of the ASTM can well be relied upon if performed properly according to Porrit and Scott *(63)*, but some investigators propose additional tests to determine special characterististics. A compression-tear test is suggested that is claimed to duplicate road-cracking of tread stocks *(64)*, while a new shape of tear-test specimen is supposed to give more accurate results than the crescent shape now in general use *(65)*. While hardness-testing is still one of the quickest and easiest methods of comparing stocks, it has well-known deficiencies. In trying to eliminate some of these deficiencies, the British have designed a new penetration hardness meter and have standardized the technique to be used with it *(66)*. Since different hardness meters are used in many countries, a nomographical comparison of the most common types should also prove of interest *(67)*.

Many of the studies of the physical testing laboratories have been concerned with processing properties of various compounds *(68)* and much work has been done in the field of rheology *(69)*. Instead of a single measurement of plasticity, one author arrived at a series of seven related tests that are said to determine the rheological properties of the stocks with great accuracy *(70)*. The effects of nip width of milling machine rolls and of the roll temperatures were the subjects of two papers which show that, while the former has but little influence, the latter can seriously alter the properties of the stock *(71, 72)*.

The need for adequate cooling of rubber machinery is further accentuated in another article *(73)* and by the development of new agents to remove scorched materials from mill rolls *(74)*. Research into this effect of mastication has shown that atomic oxygen from peroxides is freed at high temperatures and during prolonged milling operations and is the cause of most of this deterioration *(75, 76)*. Requirements for extruding processes are also to be found *(77)*.

Several new facilities for the rubber factory have shown up in 1945, such as a fast and continuous method for cementing and drying tire fabrics without subjecting workers to the toxic fumes of the solutions *(78)*. As in so many other fields, new electrical controls have appeared for maintaining constant speeds and temperatures on calenders and controlling tuber output *(79)*. Perhaps the most publicized of the electrical inventions is electronic curing *(80)*. Already a mold press has appeared on the market which has facilities for electronic preheating of the rubber in the mold, thus securing a more even heat distribution throughout the rubber mass and reducing overall curing time *(81)*.

New methods of molding *(82)* made their appearance, among them an injection molding machine for rapid manufacture of small products *(83)*. Since the mold is never cooled, the inventors claim much shorter curing time and improved homogeneity of the product due to thorough mixing of the rubber in the injection nozzle. A mold cleaner and a non-straining mold lubricant are given as further aids to the mold shop *(84, 85)*.

The molding of rubber to metal has received further consideration in studies on the theory of brass-plating and the chemical action that occurs between the brass and the rubber to form desired adhesive properties *(86, 87)*. Synthetic rubber presents special problems in its adhesion to metal and other materials, which becomes evident by the many new synthetic adhesives on the market and the development of new test methods for them *(88-91)*.

As regards tires, due to more and more exacting demands of the Armed Forces, it has become necessary to evaluate the tolerances to which tire production can be held and to assess their importance *(92)*. For the same reason, elaborate tests both on dynamometers and on actual test courses were necessary to prove tire values *(93-95)*. Some of the test fleets operated under the most grueling desert conditions day in and day out and bore witness to the excellence of American tire production. Much of the credit for this excellence must go to the makers of tire cord, who not only have developed improved cotton fibres *(96, 97)* but who also have presented the tire manufacturer with nylon and rayon cords of a wide choice of properties *(98-101)*. All these fibres have been subjected to prolonged study to determine their characteristics under various loads, temperatures and amounts of moisture *(102, 103)*.

Even though tires and tubes formed the greatest bulk of rubber production during the war, the industry turned out many remarkable and important war products that aided materially in the course of victory. Many of these have become known only now that the war is over. Early in 1940, the Germans attempted to isolate the British Isles by a combination of U-boat warfare and the magnetic mine. Ships could be protected from the latter by an expensive and cumbersome de-Gaussing belt. This, however, did not destroy the mines which remained as a potential danger, until the British built a buoyant cable coil in which sufficient magnetic forces could be created to safely explode the mines *(104)*. Buoyancy was achieved in various ways, one of which was by making the cable center of tennis balls supported in a molded rubber form.

Military Products Proved Valuable

As the tides of war turned in favor of the Allies, many a successful invasion was aided by collapsible rubber maps of the terrain to be invaded *(105)*. These maps took but little space when folded and when opened presented a vivid three-dimensional view of the topography. In order to supply the advancing troops with spare rubber parts far from home, the Navy even built a complete small rubber shop on one of the Pacific Islands capable of turning out molded goods to the amount of 6,000 pounds of rubber a day *(106)*. With similar intentions, the Army operated a tire repair shop in Italy that reconditioned as many as 500 tires a day *(107)*.

In the rapid war-time development of airplanes, the rubber industry has had a great share, much of which—like tires, fuel cells and engine mountings—is too well-known to be discussed here *(108)*. Some of the latest aids are for propellors and helicopter rotors to aid in cooling the engine, increase the propeller efficiency *(109)* and protect the blades from wear

(110). One article mentioned a method of spraying a thin layer of nylon between rubber layers of a fuel cell to prevent fuel evaporation through the walls *(111)*. Other aircraft companies have experimented with various rubber and plastic adhesives for metal-to-metal or metal-to-wood bonding and are said to have produced remarkable bond strength *(112, 113)*.

Floating Tank Built by Firestone

Claimed to have saved 10,000 lives on D-Day in Normandy and one of the best kept secrets of the war, a floating tank known as the D-D Device was built by Firestone according to a British invention *(114)*. A rubberized canvas wall reinforced by steel framework extends around the sides of a Sherman tank and is elevated to a height of some 15 feet by means of pneumatic rubber tubes and other mechanical devices. Because of the displacement of this fabric hull, the tank is buoyant and can be floated to the objectives. When it reaches them, the tubes can be instantly deflated, the wall collapses and the tank is ready for action. Some 350 of these were delivered to the Army prior to D-Day and only the quick result of the Atomic bomb obviated their use against Japan.

Since the end of the fighting, new products for civilian uses have reached all the way from pneumatic surgical tourniquets to foamed rubber powderpuffs *(115, 116)*. Yet the industry has never stopped to produce new aids for factories and shops. Periodicals reported a new heat-resistant forming pad and die for sheet metal forming-presses *(117)*. Buna N type rubbers have proved to give excellent bonding for abrasive wheels *(118)*, while other synthetics have been used in the manufacture of oil seals on rotating shafts *(119)*. A conveyor belt constructed of neoprene and fibreglass is said to outwear any other type of belt and to have negligible elongation *(120)*. For electrical recording of stresses in steel frames, strain gauges can now be molded into a rubber button that will protect them from inclement weather conditions for out-of-door use *(121)*.

The increasing need for scientific investigation has nowhere been realized more fully than in the rubber industry. Since Goodyear finished its Research Building two years ago, the Firestone Research Laboratory, was opened in 1945 *(122)* and a new Goodrich Laboratory is planned for the near future *(123)*. These laboratories are or will be fitted with the most modern of tools, electronic devices and scientific apparatus. Electron microscopes, X-ray diffraction units, Infra-red, and mass spectrometers are the more spectacular of the instruments which have received the most attention recently *(124-126)*. With these and many others, the investigations into the physical and chemical nature of rubber and synthetics have made great strides. High power microscopes have revealed facts of microchemical structures of rubber-like substances that were not to be explained by the molecular theory alone *(127-129)*. This theory itself has been extended considerably in the light of new investigations *(130-134)*.

Studies of the formation of gels, osmotic pressure, etc., have yielded valuable information on the molecular structure of the solutes *(135-139)*. Not only can rubber be dissolved in liquids, but gases like oxygen are soluble in rubber and a great deal of work has been done to determine this effect and correlate it with the oxidation and deterioration of the compound. The data seem to show that oxidation progresses only under the action of peroxides or atomic oxygen and that, therefore, the best anti-oxidants are those that prevent the formation of these peroxides *(140-142)*. The phenomenon of exposure-cracking can be explained in a similar way through the combination of ozone and strain, the latter being necessary to tear the deteriorated particles and present fresh surfaces to the action of the ozone *(143)*. In the processing of rubber, however, peroxides are helpful chemicals if carefully controlled *(72-76, 144, 145)*.

For similar reasons, a method was also developed to determine the amount of peroxides contained in a cured vulcanizate *(146)*. This method is part of an increasing field for research in the determination of the constituents of an unknown piece of cured stock. As already mentioned, this is of particular importance for sorting reclaim and several tests have been suggested to identify certain base polymers *(147-149)*, accelerators *(150)*, vulcanizing agents *(151)* and even the amount of unsaturation *(152)* which in turn gives an indication of the resistivity to oils and oxidation.

In line with this great volume of chemical research, rubber physicists have reported a profusion of data which can be mentioned only briefly. Working in general on the cured vulcanizates, their investigations have covered such characteristics as stress-temperature relations *(153, 154)*, the phenomenon of creep and relaxation *(155-157)* and the mathematical theories connected with them *(158-160)*. In order to measure Young's Modulus at extremely small deflections, one author has used sound waves of 10,000 C.P.S. frequency, whose speed of propagation along a rubber fibre gave him a means to calculate that modulus *(161)*. Other investigators have determined properties of elastomers at low temperatures, tests which are of great importance to the designers of high altitude aircraft *(162-165)*.

Measurements of Dynamic Modulus

Since rubber is one of the peculiar substances whose characteristics are dependent on the rate of loading, dynamic tests have always been of great importance and measurements of dynamic modulus and internal friction have been made in many laboratories *(166-168)*. Some investigators have focused their attention in particular on one fast stretching or retracting stroke and by means of high speed photography have discovered, for instance, that a contracting rubber band does not do so evenly, but in some sort of wave form *(169-171)*.

To conclude, it might be well to remember that all this almost unbelievable development was made in a single year on a product originally used by Indians to make waterproof bags for Spanish gold *(172)*, a product first made synthetically in a laboratory some 35 years ago *(173)*, that today approaches an annual production figure of 1,000,000 tons. And yet the future is unlimited; with natural rubber returning in ever-increasing quantities, with ample raw materials for the manufacture of synthetics and rubber chemicals *(174-178)* and with research to point the way, we may well look forward to boundless advances in rubber.

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Editorials . . . . . .

The Price of Natural Rubber

NATURAL rubber shipments are beginning to arrive in the United States from the Far East, usually in cargoes of from 7,000 to 8,000 tons. Most of these shipments are coming from Malaya. but at least one has arrived from the Netherlands Indies. Knowledge of the arrival of these shipments has of course led to speculation as to their distribution and their cost. As usual, most of the speculation has been erroneous. For example, trade rumor has it that all of the incoming rubber will be allocated to American rubber manufacturers while rumors on the price being paid range from 36 to 38 cents a pound.

For the record these are the facts on distribution and price as of this writing: Distribution of all natural rubber now coming to the United States lies in the hands of an allocation committee currently performing the functions of the former Combined Raw Materials Board. No set price has been determined for the rubber and it is being warehoused until such time as a definite price is agreed upon between producing and consuming countries. Furthermore, with regard to distribution, it is already known that all of the incoming rubber will not be turned over to American rubber manufacturers, but will be allocated on some equitable arrangement to various countries, including England and France.

There is no question but that the political disturbances in the Netherlands Indies and the difficulties of resuming production in Malaya are causes for the limited amount of natural rubber now being shipped from those rubber-producing areas. On the other hand there can be little doubt that heavy shipments will not be forthcoming until a definite price structure is determined. Some progress is being recorded in this direction and an over-all agreement, involving both a transitional price and an eventual price for natural rubber, should be announced within the next few weeks.

It has recently been learned that the United States is seeking an agreement with the major rubber-producing countries on an international ceiling price for natural rubber, one which would remain in effect during the transition period. Negotiations for such a price were started last November during the meeting of the International Rubber Study Group in London. They have since been continued without fanfare or publicity and, as indicated above, will be brought to a head shortly.

The precedent-making negotiations are expected to result in a price which would make due but limited allowance for inflated costs during the transition period and would provide a basis for shifting over to a lower price at some future date when the basis for long-term pricing is finally developed by the Rubber Study Group. Not until such a price formula is worked out can the United States properly formulate its own national rubber policy, since the eventual price of natural rubber will have a direct bearing on the amount of synthetic rubber produced annually in this country.

Passenger Tire Units

THE Civilian Production Administration has set a goal of 66,000,000 passenger tire units for the year of 1946. Should this goal be met it would represent the peak year in the production of such tires. Should it be met it would still fall short of potential demand by some 8,000,000 to 10,000,000 units. As currently figured, the automobile industry, despite the crop of strikes, will require 22,000,000 tires as new equipment, leaving 42,000,000 units for replacement needs, with the latter estimated at a minimum demand of 50,000,000 units. To aggravate the situation further, tire manufacturers are of the opinion that less than 60,000,000 units will actually be produced, and if labor difficulties now in the offing come to pass even that figure will not be reached. The obvious reaction to these figures and estimates seems to be that camelback manufacturers may expect a satisfactory year in 1946.

CURRENT NEWS OF THE MONTH

DISPOSAL OF SYNTHETIC RUBBER PLANTS DEPENDENT ON NATIONAL RUBBER POLICY

THE problem of disposal of government-owned synthetic rubber manufacturing facilities was brought sharply to the fore on January 16 with the issuance of an interim report to Congress by the Surplus Property Administration. The report made it clear that a satisfactory disposal program cannot be completed until a national rubber policy is definitely formulated since until such time potential purchasers would not have a clear view of market prospects upon which to base their bids. W. Stuart Symington, Surplus Property Administrator, emphasized the fact that "no good purpose" would be served by long delaying the making of synthetic rubber plants available for disposal to private producers once a national policy has been framed. He urged that a national policy be determined at the earliest possible moment in view of the fact that a better return to the government upon its investment could be secured now than would disposal of the synthetic rubber manufacturing facilities at a later date.

The report further indicated that there appears to be little reason why certain plants, particularly the three plants engaged in the production of GR-M (neoprene) and GR-I (Butyl), should not be declared surplus and subjected to disposal action at an early date. The competitive positions of these materials was said to be relatively secure and therefore not involved in the decisions based upon considerations of national defense. A ready market for these plants was predicted as soon as plans are completed for disposal.

There also appears to be no particular reason, according to the report, for delay in making some of the alcohol-butadiene capacity available for immediate disposal. Because of the high cost, no provision is likely to be made under normal conditions for producing copolymers from this material. It was indicated, however, that the process is believed to be one for which some facilities should be retained in stand-by condition and this element can be made a condition of disposal.

With respect to GR-S, the report stated that there were some plants for which, in view of their location or characteristics, there exists no prospect of being retained in the national defense program and it would be possible to declare these surplus for disposal for other uses than rubber production "without prejudice to the planning of the permanent program."

Pointing out that it appears to be the disposition of the Reconstruction Finance Corporation not to make partial decisions with respect to the surplus status of synthetic rubber facilities but rather to hold the whole body of decisions in suspense until the national rubber program has been formulated, the report indicated that the Surplus Property Administration agreed with this reasoning.

In its conclusion, the report stated that once the details of a national rubber program have been developed the Surplus Property Administration will be prepared promptly to formulate a disposal plan for plants which are declared surplus, keeping in mind whatever conditions are set forth in the national policy.

Hearings Held at Washington

As reported in our previous issue, public hearings on the over-all rubber situation were held by the Inter-Agency Policy Committee on Rubber in Washington on January 8, 9 and 10. Whereas the Committee had expected to be deluged with requests from various organizations and individuals to express their views at these hearings, very few requests were received and only a handful of witnesses appeared. William L. Batt, chairman of the Policy Committee, publicly stated that he did not know "what significance to deduct from the fact we have had so few requests to be heard."

One of the major developments of the hearings included the stand taken by Mr. Batt himself that in the final analysis the determination as to what the future of the domestic synthetic rubber industry must be lies with Congress. The question raised was whether it is possible to determine without a legislative statement whether the public "will want synthetic rubber in peacetime in sufficient quantities to enable the synthetic rubber plants to stand competitively on their own feet."

Included among the few witnesses to appear were A. L. Lewis, director of research of the United Rubber Workers of America, and George J. Burger, tire consultant of New York City, neither of whom had any specific program to recommend. Several additional witnesses who had requested to be heard failed to show up at the hearings which were concluded within one hour after they opened on January 8.

Mr. Batt made it clear, however, that despite the failure of witnesses to turn up, many of the operators of the synthetic plants had already been privately consulted as well as many large and reputable groups including oil and gas company authorities. Completion of the Policy Committee's recommendations in the form of a report was promised by Mr. Batt within 30 to 60 days.

International Agreement Sought

In the meantime it has been learned that the United States is seeking an agreement with the major rubber-producing countries on an international ceiling price for natural rubber, one which would remain in effect during the transition period. These negotiations, which are being conducted without public announcement, parallel the efforts of the International Rubber Study Group, which held a meeting in London last November, to arrive at a long term pricing basis for natural rubber as compared with synthetic rubber.

The decision to seek an agreement on rubber is based upon three fundamentals: (1) The expansion of a large synthetic rubber capacity in the United States; (2) The fact that there is no historical basis for relating natural and synthetic rubber prices; (3) The recognition that the price of synthetic rubber and that of natural rubber must somehow be related in some feasible ratio.

It is hoped that these private negotiations will develop a price which would make due but limited allowance for inflated costs during the transition period and would provide a basis for shifting over to a lower price at some future time when as a result of the activities of the Rubber Study Group the basis for long term pricing has been developed. An interim price of 18½c a pound for natural rubber has been suggested by John L. Collyer, president of the B. F. Goodrich Co. This price was the prevailing level at which rubber was sold in the Far East during the pre-war period while the United States was building up its emergency stockpile.

1946 Called "Famine Year"

Measured against pre-war consumption and even greater post-war requirements, 1946 will continue to be a "famine year" so far as natural rubber is concerned, according to a statement issued by A. L. Viles, president of the Rubber Manufacturers Association, on January 2. Mr. Viles based this appraisal on latest reports from the major rubber-producing areas and to it he coupled a warning that most sections of the world market will suffer acute shortages of finished rubber products for many months to come and probably into 1947.

The RMA executive pointed out that

American trade circles expect a peacetime record consumption of approximately 900,000 tons of rubber in the United States in 1946. In light of difficult production problems in the troubled Far East, natural rubber producers may be unable to meet more than one-third of this demand and the best current estimates are that natural rubber receipts will run between 250,000 and 350,000 tons.

Mr. Viles cited the fact that relatively low cost petroleum-base synthetic rubber plants with a proven capacity of between 500,000 and 600,000 tons of GR-S are currently operating, to which can be added an estimated output of 70,000 tons of GR-I and 30,000 tons of GR-M. The basic raw materials requirements of American rubber manufacturers will be met in 1946, he added, even though demand rockets almost 50% above the 653,000 tons used in the last full peacetime year, 1940. It is estimated that expected natural rubber receipts may permit the average conversion of up to 70% synthetic and 30% natural rubber.

Some Rubber Being Received

While negotiations concerning the price of natural rubber are being continued, some shipments have been arriving in the United States. For example, 8,000 tons arrived in New York harbor on December 22 on the *S.S. Canton Victory* from Malaya. Although it was reported that a price of 34c per pound had been paid for this rubber, the Reconstruction Finance Corporation denied this report and pointed out that the price could not be determined until the conclusion of negotiations now being held between the RFC and the governments of rubber-producing countries. It is understood that the cargo involved has been warehoused and will not be distributed until some definite price has been agreed upon.

Shipments are also beginning to arrive from French Indo-China. The RFC reported on January 20 that the *S.S. Red Rover* is expected shortly with 7,702 tons as is the *S.S. Mary Ann Livermore* with 8,000 tons. The *S.S. Floyd Spencer* is expected to leave Saigon before the end of the month with at least 7,000 tons.

Although presumably most of the natural rubber arriving in the United States will be allocated to American rubber manufacturers, the RFC has indicated that its actual disposition lies in the hands of the Combined Raw Materials Board and some of it may be apportioned to other countries, including England and France.

According to a report from Rio de Janeiro on December 26, the Brazilian Government has issued a decree authorizing transfer to the government of the Ford rubber plantations in Brazil. The government is reported to have bought the properties (Belterra and Fordlandia) for the token sum of $250,000. Ford is said to have invested a total of approximately $9,000,000 in the plantations. It is also understood that Brazil plans to spend about $1,215,000 for further development of the properties.

Amendments to Rubber Order

Two changes have been made in the over-all rubber order since our last issue. Amendment No. 1 to Rubber Order R-1, as Amended Nov. 2, 1945, which was issued December 29, replaces OPA Ration Order 1-A as the official document restricting tires to rolling wheels on new motor vehicles and other new mechanized equipment. In brief, this is the order which prohibits manufacturers of new equipment from acquiring tires and tubes as spares.

The second change was in the issuance of Amendment No. 2 to Appendex II of the amended rubber order. Issued on January 2, this amendment permits the manufacture of synthetic tires without the "red dot" identification marking previously used to identify such tires. Synthetic tires will continue to bear on both sides of the tire a permanent brand indicating the synthetic construction used. The brand must be at least 5/64ths of an inch high, unless this size is found to be unreasonably large. The brand for synthetic tires will continue to be the letter "S", together with the number identifying the construction used.

Appendix V of the rubber order, which governed the sorting and packing of scrap tire parts, was officially revoked on December 27.

Additional Orders Issued

A few other regulations of direct interest to the rubber manufacturing field have also been issued in recent weeks. These included the following:

Amendment No. 14 to M.P.R. 132 (Rubber Footwear) was issued on December 21. Under the terms of this amendment the item "Women's warm-lined (shearling)" under "Gaiters" is changed to read "Women's warm-lined (shearling trim)," and ceiling prices are set for both misses' and child's warm-lined gaiters.

Special ceiling prices applicable to tires sold by "persons owned or controlled by a brand owner or brand owners" were established for sizes 5.50-15 and 6.00-15 in Amendment No. 9 to R.M.P.R. 143 (Wholesale Prices for New Rubber Tires and Tubes). This amendment was issued on January 18 and is effective January 23.

Dollar-and-cent ceiling prices have been established for six types of men's new rubber footwear declared surplus by the Armed Forces and now being sold by the government for civilian use. These prices are contained in Order No. 91 under Supplementary Order 94 (Maximum Prices for Sales of Surplus Rubber Footwear). The ceilings, effective December 21, are in line with previous ceilings established for similar types of footwear.

Tire Rationing Officially Ended

All tires were officially released from rationing at midnight, December 31, 1945. Rationing was ended, according to OPA Administrator Chester Bowles, because production of tires, particularly passenger tires, the shortage of which has been most acute, has increased steadily during the past two months (November and December), reaching an output for the quarter of about 11,000,000. Both OPA and the Civilian Production Administration agreed that rationing could be lifted when production reached this level.

The end of rationing, however, does not by any means indicate the end of the tire shortage which, according to consensus of opinion of tire manufacturers, will continue throughout 1946. The normal demand for replacement passenger car tires in 1946 is 27,000,000 units. On top of this there is a backed up demand of 17,000,000 units and an estimated need for 22,000,000 additional for new cars. This makes for a grand total of 66,000,000 units demand against a current production rate of approximately 50,000,000 units.

A goal of 15,000,000 tires for passenger cars and motorcycles in the first quarter of 1946 was announced by the CPA on January 18. This is approximately 30% more than actual production in the last quarter of 1945, which amounted to approximately 11,250,000. The target for truck and bus tires for the first three months of the current year was set at 3,500,00 units, as against 3,115,000 in the last quarter of 1945. It was also estimated that 13,500,000 inner tubes for passenger car and motorcycle tires and 3,150,000 tubes for truck and bus tires would be produced in the 1946 quarter.

According to a statement made on January 9 by W. D. R. Straughn, tire yarn sales manager of E. I. duPont de Nemours & Co., Inc., the tire industry will consume all of the high tenacity rayon yarn produced in the next two years. He further stated that the rubber industry would consume the present production of 195,000,000 pounds of high tenacity rayon yarn for some years to come and that it certainly would consume much larger quantities during the approaching two years if it were available.

Wilmington Names Zeilstra

Edward E. Zeilstra, formerly chief rubber chemist of the Wire Division of the John A. Roebling's Sons Co., Trenton, N. J., has been appointed midwestern representative by the Wilmington Chemical Corp., New York City. Mr. Zeilstra, a native of Grand Rapids, Michigan, graduated from Calvin College, with a B.Ch.E. degree, and joined Ford Motor Co. in 1935, where he became technical supervisor of the inner tube and miscellaneous rubber goods department. In January, 1943, he became chief rubber chemist and rubber development engineer of Roebling's. Under Mr. Zeilstra's direction the Roebling laboratory developed into a very complete unit exercising complete control over raw materials, goods in process, finished products and development. Mr. Zeilstra will make his headquarters in the First Central Tower, Akron, Ohio.

APS HIGH POLYMER DIVISION MEETS AT COLUMBIA UNIVERSITY

A meeting of the High Polymer Division of the American Physical Society, of which W. F. Busse of the General Aniline & Film Corp., Easton, Penna., is chairman, was scheduled to be held at Columbia University in New York City on January 24, 25 and 26. A total of 26 papers were scheduled for presentation and it is hoped to be able to publish abstracts of most of these papers in an early issue. Titles and authors of the scheduled papers follow:

(1) Thermal Diffusion of Polymers, by P. Debye (Cornell University).

(2) X-Ray Diffraction by Potassium Laurate Solutions—A Contribution to the Mechanism of Emulsion Polymerization, by E. W. Hughes (Shell Development Co.).

(3) The Use of Color and Fluorescence Indicators for Studying the Constitution of Glasses, by W. A. Weyl, (Pennsylvania State College).

(4) The Mechanical Properties of Fibers, by Henry Eyring and George Halsey (Textile Research Institute Laboratories, Princeton, N. J.).

(5) Stress-Relaxation of Compressed Cork, by S. L. Dart and Eugene Guth (University of Notre Dame).

(6) The Formation of Ionized Water Films on Dielectrics under Conditions of High Humidity, by Robert W. Field (General Radio Co.).

(7) The Molecular Structure of Some Polyuronides as Revealed by X-Ray Diffraction Studies, by K. J. Palmer (Western Regional Research Laboratory).

(8) Statistics of Cross Linked Polymers, by Walter H. Stockmayer (Mass. Inst. of Technology).

(9) Thermal Polymerization of Drying Oils, by H. E. Adams and P. O. Powers (Armstrong Cork Co.).

(10) Some Thermodynamic Properties of Slightly Cross-linked Gels, by R. F. Boyer and R. S. Spencer (Dow Chemical Co.).

(11) The Determination of Polymer-Liquid Interaction by Swelling Measurements, by Paul Doty and Helen S. Zable (Polytechnic Institute of Brooklyn).

(12) Electrostatic and Tensile Properties of Rubber and GR-S at Elevated Temperatures, by R. S. Havenhill, H. C. O'Brien and J. J. Rankin (St. Joseph Lead Co.).

(13) Significance of the Stress-Temperature Relationships for Rubber, by Paul E. Wack, R. L. Anthony and Eugene Guth (University of Notre Dame).

(14) The Theory of Permanent Set at Elevated Temperatures in Natural and Synthetic Rubber Vulcanizates, by R. D. Andrews, E. E. Hanson and A. V. Tobolsky (Princeton University and Firestone Tire & Rubber Co.).

(15) The Crystallization of Unvulcanized Rubber at Different Temperatures, by Lawrence A. Wood and Norman Bekkedahl (National Bureau of Standards).

(16) Tackiness of GR-S and Other Elastomers, by W. F. Busse, J. M. Lambert and R. B. Verdery (General Aniline & Film Corp.).

(17) Stress-Time-Temperature Relations in Polysulfide Rubbers, by M. D. Stern and A. V. Tobolsky (Princeton University).

(18) Application of Infra-red Methods in the Structural Examination of Synthetic Rubber, by J. E. Field, D. E. Woodford and S. D. Gehman (Goodyear Tire & Rubber Co.).

(19) Viscometric Investigation of Dimethyl Siloxane Polymers, by Arthur J. Barry (Dow Corning Corp.)

(20) Some Fundamental Relationships between Intrinsic Viscosity, Diffusion and Sedimentation Constants, and Thermodynamic Properties of High Polymer Solutions, by Robert Simha (National Bureau of Standards).

(21) Thin Section Methods for the Electron Microscopic Examination of Cured Polymers, by H. C. O'Brien (St. Joseph Lead Co.).

(22) Attachment for Obtaining Angular Distribution of Scattered Light from Measurements with a Ninety-Degree Turbidimeter, by J. N. Wilson (Shell Development Co.).

(23) A Photoelectric Light Scattering Instrument and a Differential Refractometer for Measuring Molecular Weights, by P. P. Debye (General Aniline & Film Corp.).

(24) Thermal Expansion and Second-Order Transition Effects in High Polymers. III. Time Effects, by R. S. Spencer and R. F. Boyer (Dow Chemical Co.).

(25) A New Approach to the Theory of Relaxing Polymeric Media, by M. S. Green and A. V. Tobolsky (Princeton University).

(26) Application of Molecular Distribution Methods to the Statistical Mechanics of High Polymer Solutions, by Bruno H. Zimm (Polytechnic Institute of Brooklyn).

Coming Events

Feb. 1. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Feb. 8. Quebec Rubber & Plastics Group, Ritz-Carlton Hotel, Montreal, Canada.

Feb. 25-Mar. 1. A.S.T.M., Spring Meeting, Pittsburgh, Penna.

Feb. 25-Mar. 2. 20th Exposition of Chemical Industries, Grand Central Palace, New York City.

Mar. 8. Quebec Rubber & Plastics Group, Ritz-Carlton Hotel, Montreal, Canada.

Apr. 10-12. Rubber Division, A.C.S., Atlantic City, N. J.

June 24-28. A.S.T.M., 49th Annual Meeting, Buffalo, N. Y.

Sept. 8-15. American Chemical Society, Chicago, Ill.

RUBBER DIVISION MEETING DEFINITE FOR APRIL 10-12

The meeting of the Division of Rubber Chemistry of the American Chemical Society, to be held in Atlantic City, N. J., has now been definitely scheduled for April 10, 11, and 12, according to H. I. Cramer, secretary of the Division. Headquarters for the Division will be in the Hotel Ambassador, but the Division Banquet will be held at the Chelsea Hotel on Thursday evening, April 11. Harry Bimmerman (DuPont) is in charge of the Committee handling local arrangements for the meeting.

The Papers Committee of the Division invites the industry to submit papers dealing with the synthetic rubber field or with any phase of the chemistry and technology of rubber. Abstracts of papers of 200 to 250 words should be forwarded in triplicate to Dr. Cramer at Sharples Chemicals, Inc., 123 South Broad St., Philadelphia 9, Pa., by February 12. In submitting abstracts, the following information is required: the laboratory in which the work to be reported was carried out, present business connection, and an estimate of the time required for presentation of the paper. In order to insure prompt publication of the paper, it is necessary to submit three copies of the manuscript in its final form at the time of the meeting. It is a rule of the Society that at least one author of any paper by American chemists must be a member of the A.C.S.

The Rubber Division is collaborating with the Cellulose, Colloid, Organic, Paint, Varnish and Plastics, and Physical and Inorganic Chemistry Divisions in arranging a symposium entitled "The First Polymer Forum." Any paper dealing with the subject of High Polymer Chemistry received from the membership which seems suitable for inclusion in the program of this symposium will be submitted to the Chairman of the Forum. In the event the date of the Forum conflicts with the Division meeting, papers presented before the Forum by members of the Division will be repeated as a part of the Division program.

During the past year a number of Division committees have been active in spite of the war and of the fact that the meetings were suspended. A committee under Harry Outcault (St. Joseph Lead) has made a study of the By-Laws and has recommended certain revisions incorporating a number of amendments passed by the Executive Committee in recent years and other changes deemed desirable. Copies of the revised By-Laws have been sent to active members and ballots indicating approval or rejection of the revisions should be mailed to Dr. Cramer not later than April 1.

Another committee, headed by Dr. J. McGavack (U. S. Rubber Co.), has completed its work on the "Annual Bibliography of Rubber Literature" for 1940-41 and this valuable reference work will be issued soon without charge to all members and associate members of the Division.

PEAK PRODUCTION IN 1946 PREDICTED BY AUTHORITIES

Year-end statements issued by executives of the large rubber companies indicate that the rubber industry is expected to hit peak production during the coming year. The year 1946 will be largely devoted to catching up on long-deferred and urgent demands for civilian products and to the development of postwar potentialities of new materials which will assure maximum service and lowest cost to users of all types of rubber products.

According to Herbert E. Smith, president of the U. S. Rubber Co., the rubber industry is expected to produce goods in 1946 with a value of $1,500,000,000, an increase of 66 per cent over the corresponding figure of $900,000,000 in 1939, the last peacetime production year. Tires will account for the major part of this record production. More than 80,000,000 units, of which 66,000,000 will be passenger car tires, is the goal of the industry operating at capacity. Although other goods, such as footwear, golf balls, "Lastex" and drug sundries will be scarce in the early part of the year, supplies will greatly increase as the year progresses, Mr. Smith stated.

900,000-Ton Consumption Seen

Total consumption of rubber in the United States is estimated by Mr. Smith at 900,000 tons in 1946, which compares with the previous high of 780,000 tons in 1941 and an average of 540,000 tons in pre-war years. Of the 900,000 tons, approximately one third may be natural rubber and the remainder various kinds of synthetic rubber. World consumption of all types of rubber for 1946 is placed at 1,400,000 tons. The year's potential world production of all such rubbers is estimated at 1,900,000 tons, of which 1,200,000 is synthetic capacity in the United States.

John W. Thomas, chairman of the Firestone Tire & Rubber Co., stated that the synthetic passenger car tire available today is as good as the pre-war natural rubber tire. Shipments of natural rubber from the Far East growing areas were still uncertain due to political conditions, dislocation of labor, shortages of equipment, food and other consumer goods, and other factors, thus preventing a possible estimate of future production at the present time, according to Mr. Thomas. He revealed that the Firestone's Liberian plantations have been able to consistently increase production and furnish a goodly portion of the natural rubber received in the Untied States throughout the war years.

Mr. Thomas pointed out that the United States learned two valuable lessons during the war which should be of value to the industry. One was the importance of growing our own natural rubber and the other the ability to manufacture a synthetic rubber which in some products performs better than natural rubber. The knowledge of synthetic rubber manufacture should serve as a weapon against future loss of supply of this material in a national emergency and prevent wide fluctuations in the price, Mr. Thomas indicated.

The out-and-out competition between natural and synthetic rubber would be the moot question in 1947, according to John L. Collyer, president of the B. F. Goodrich Co. No forecast could be made of what the exact performance-price balance between these materials would be but technical progress in the manufacture and use of synthetic rubber would continue, Mr. Collyer predicted. The success that American scientists and engineers had in making synthetic rubber do "almost everything" that rubber had to do in helping win the war was so extraordinary that in the month of September, 1945, it was necessary to use only 5,787 tons of natural rubber—only about 11 per cent of the total.

It is not anticipated that development of postwar products of synthetic rubber would reach any considerable volume in 1946, mainly because equipment for their manufacture is not available, Mr. Collyer indicated. However, toward the end of the year and in 1947 several classes of products which displayed potentialities during the war would go into increasing production and use, he felt. Outstanding among these were rubber spring suspensions, foamed latex, various types of vibration dampeners and sound insulators, and rubber used in protective films and coatings. In the current year, automobile tires and tubes were expected to account for 70 per cent of the total volume, with industrial products, footwear, wire and cable insulation, and drug sundries following in about that order to make up the remaining 30%.

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., placed emphasis on the importance of a much higher degree of domestic unity between labor and management in order for the rubber industry to move forward rather than drift into dangerous conditions. With the domestic uncertainties cleared up, he was confident that there was a great market awaiting the products of American energy and resourcefulness.

Philblack Moves New Akron Office

The Philblack Division of the Phillips Petroleum Co., headed by Frank Andrews as sales manager, has moved its Akron, Ohio, offices from the First Central Tower Building to the Evans Bank Building, 335 South Main St., Akron 8, Ohio. The phone number remains as Blackstone 6114. The Philblack Export Division of the company, headed by Walter Grote, is now located at the Irving Trust Building, 80 Broadway, New York 4, N. Y.

SPECIAL TYPE CONVEYOR ROADWAY USES PNEUMATIC TIRES

Pneumatic tires designed primarily for industrial equipment have come into new usage in a special type conveyor belt roadway that is hauling more than 450 tons of coal, rock and shale an hour from the Locust Coal Company mines at Shenandoah, Pennsylvania. The 36-inch belt, cushioned by tires, was built by The Goodyear Tire and Rubber Company of Akron, Ohio, has been in service more than a year, yet shows little or no wear. The 4.00 x 8 six-ply tires, mounted on shafts revolving in bearings, are placed at the dumping point to absorb the shock of falling material.

SHROYER, WILSON AND SAUNDERS HEAD DETROIT RUBBER GROUP

J. R. Shroyer, of the R. T. Vanderbilt Co., Paul Wilson, of the Ford Motor Co., and Gordon Saunders, of the Dodge Motor Co., were elected chairman, first vice-chairman, and second vice-chairman, respectively, of the Detroit Rubber & Plastics Group, Inc., at the combined Christmas Party and Meeting of the group, held at the Detroit-Leland Hotel in Detroit on December 14. E. J. Kvet (Baldwin Rubber) was re-elected secretary-treasurer, and C. W. Selheimer (Wayne University) was named assistant secretary-treasurer.

In addition to the officers, various committee members were named at the meeting, as follows: *Educational*—Fred Wehmer (Minnesota Mining), and James McClellan (Minnesota Mining); *Membership*—William Davies (Thiokol), and Vernon Meyers (Corduroy Rubber); *Program*—Fred Haushalter (Baldwin Rubber), and R. C. Knapp (U. S. Rubber); *Entertainment*—Tom Halloran (Chemical Products), and George Horsphal (American Cyanamid); *Publicity*—N. L. Schreiber (Paramount Rubber). The following were named as members of the Advisory Board: W. G. Nelson (U. S. Rubber), W. J. McCortney (Chrysler), W. M. Phillips (General Motors Research), and Paul Wilson (Ford Motor). John Dudley (Chrysler) was named counselor.

The featured speaker at the meeting, attended by approximately 185 members and guests, was Dr. Webster N. Jones, director of the College of Engineering of the Carnegie Institute of Technology, Pittsburgh, Penna. Taking as his topic "Engineering Tomorrow," Dr. Jones stated that the veteran of World War II and his problems are of particular concern to engineering in general and to the faculty of Carnegie Tech in particular. He said it was the aim of the faculty to bring the veteran to professional status by such means as refresher courses, graduate study and counseling For this work, the veteran must have had a satisfactory background and while at the Institute he must maintain a satisfactory scholastic standing. The G.I. "Bill of Rights," he added, does not completely solve the problem of the veteran.

Stating that the contribution of the engineer of tomorrow depends on the background he receives today, Dr. Jones stated that in order to give a balanced background the program at Carnegie Tech is divided into three stems: basic science, technical or engineering, and humanistic-social. The past war, he reported, has shown the need for strengthening the scientific portion of the engineering curriculum. The war has also shown the great need for graduate work if engineering scientists are to be produced.

The meeting also featured musical and acrobatic entertainment and the distribution of a large number of prizes, the latter having been made possible by donations received from the following concerns:

Advance Solvents & Chemical Corp., American Zinc Oxide Co., J. T. Baker Chemical Co., Baldwin Rubber Co., Barrett, Binney & Smith, Godfrey L. Cabot Co., Caldwell Co., Carter Bell Mfg. Co., Central Rubber & Steel Corp., Chemical Products Co., Cleveland Liner & Mfg. Co., Dow Chemical Co., DuPont, Firestone Tire & Rubber, General Tire & Rubber Co., Givaudan-Delawanna, Inc., C. P. Hall Co., Hercules Powder Co., Herron Bros. & Meyer, J. M. Huber Co., Hycar Chemical Co., *India Rubber World*, Industrial Rubber Goods Co,

Also F. F. Meyers Co., Midwest Rubber Reclaiming Co., Minnesota Mining & Mfg. Co., Moore & Munger, Monsanto Chemical Co., H. Muehlstein & Co., Naugatuck Chemical, New Jersey Zinc Co., Pequanoc Rubber Co., Philadelphia Rubber Works, Phillips Petroleum Co., Piqua Stone Products Co., Rohm & Haas Co., RUBBER AGE, Sharples Chemicals, Inc., A. Schulman, Inc., Scott Testers, Inc., Stamford Rubber & Supply, Stanco Distributors, Inc., Standard Chemical Co., Stauffer Chemical Co., Sun Oil Co., Tenite Corp., Thiokol Corp., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., C. K. Williams & Co., Wilmington Chemical Co., Witco Chemical Co., Xylos Rubber Co., Yale Rubber Co.

Ontario Group Hears Rowzee

E. R. Rowzee, director of research of the Polymer Corp., Sarnia, Ontario, was the principal speaker at a joint meeting held by the Ontario Rubber and Toronto Sections of the Chemical Institute of Canada at the Royal York Hotel in Toronto on December 4. Approximately 165 members and guests attended the meeting. Mr. Rowzee discussed the "German Synthetic Rubber Industry," and told of his work as a member of the technical group sent into Germany to determine the status of that country's synthetic rubber industry. Among points made by the speaker were that a remarkable research laboratory was erected by I.G. Farbenindustrie at Leverkusen at a cost of $4,000,000; that many of the large processing plants were relatively undamaged; that production in Germany dropped from 250,000 tires in August, 1944, to 80,000 in February, 1945; that there was no indication that Germany had produced a rubber of the GR-I type; and that the blockage against Germany was quite effective. In concluding his talk he stated that in his opinion the American and Canadian synthetic rubber industry will undoubtedly ensure an adequate supply of rubber in case of another emergency, a more stabilized natural rubber price, and more widespread use of rubber than ever before. Three educational films were also presented at the meeting through the courtesy of Professor Croall of the Ontario College of Education.

BOSTON RUBBER GROUP NAMES GEENTY, REYNOLDS, PATRICK

James R. Geenty, of Goodall-Sanford, Inc., Reading, Mass., and Charles R. Reynolds, of Cambridge Rubber Co., Cambridge, Mass., were elected chairman and vice-chairman, respectively, of the Boston Rubber Group at the Annual Winter Meeting and Christmas Party of the group, held at the Copley Plaza Hotel in Boston on December 21. Richard K. Patrick, of the Windram Manufacturing Co., South Boston, Mass., was elected secretary-treasurer. Harry A. Atwater (Hood Rubber), Bernard H. Capen (Tyer Rubber) and John R. Clark (Hood Rubber) were elected to the Executive Committee.

Approximately 340 members and guests attended the meeting, which featured W. E. Kavenagh, development manager of the Windsor Manufacturing Co., Goodyear subsidiary at Windsor, Vermont, as principal speaker. During the meeting the presiding chairman introduced Arne Johansen, of the Royal Norwegian Purchasing Agency, an unexpected guest. Mr. Johansen acted as rubber director of Norway during the German occupation. It was announced that paid membership of the group had reached 532 as of the night of the meeting. Door prizes consisted of bottles of liquor contributed by Ralph Huber and Frank DeLuca.

Taking as his topic "Germany via Jeep," Mr. Kavanagh traced his movements through Europe as a member of the investigating team sent to Germany recently by the Shoe and Leather Division of the Office of the Quartermaster General. He described the devastated condition of various cities and towns and reported on discussions held with many interesting people interviewed during the tour. He also discussed some of the findings of the investigating team and described the I. G. Farbenindustrie laboratories at Leverkusen.

Chicago Holds Christmas Party

Approximately 550 members and guests attended the fifth Annual Christmas Party and Ladies' Night of the Chicago Rubber Group, held on December 21 at the Morrison Hotel in Chicago, Ill. A cocktail hour preceded the dinner. Lucite compacts were presented to each lady present. The party was the largest held to date and thanks are due to the special committee in charge headed by Bob Elliott as chairman, assisted by Frank Taylor, Warren Bickel, M. D. Beck, Ralph Anschuetz, and Walter Peterson. The success of the party was attributed to generous donations received from various concerns in the field.

Eagle-Picher Co., Cincinnati, Ohio, recently purchased a substantial interest in the common shares of McArthur, Irwin, Ltd., Montreal, Canada, manufacturers of white lead and colors.

PHILADELPHIA RUBBER GROUP ELECTS OFFICERS FOR 1946

The annual winter meeting of the Philadelphia Rubber Group was held at the Benjamin Franklin Hotel in Philadelphia, Penna., on January 4, with approximately 115 members and guests in attendance. The meeting featured the election of officers for 1946, a talk by Dr. B. S. Garvey, Jr., technical service manager of the B. F. Goodrich Chemical Co., Cleveland, Ohio, a business session, and special entertainment.

Election of officers resulted in the following selections: *Chairman,* W. B. Monroe (Linear Packing); *Vice-Chairman,* L. K. Youse (L. H. Gilmer); *Secretary,* T. T. MacConnell (U. S. Rubber Reclaiming); *Treasurer,* W. B. Dunlap, Jr. (Lee Rubber). The following were elected as members of the board of directors: *Three Year Terms,* William Ayscue (DuPont), D. E. Henderson (Associated Rubber Products); *Two Year Terms,* Ralph Davis (MacEwan & Smith), B. F. Benson (Goodrich); *One Year Terms,* V. H. Perrine (Thiokol), C. H. Fisher (Eastern Regional Laboratory).

Discussing "Investigating the German Synthetic Rubber Industry," Dr. Garvey, speaker of the evening, stated that the investigation was made as a member of the Rubber Field Team of the Technical Industrial Intelligence Committee. The orders were to investigate the German methods of making synthetic rubber and manufacturing finished goods from it and report back to Washington as soon as possible. In agreement with these orders the plants were investigated from one day to one week after they were taken.

The speaker described his own trips by airplane, weapons carrier, and jeep and some of his personal experiences in the forward areas before V-E Day. He also explained the military status of the investigators and the arrangements for travelling, eating, and billets. Comments were made on general conditions in Europe and on the condition of some of the plants investigated. These were illustrated with slides of pictures taken on the trip. The procedure for plant investigations was described.

In compounding, processing, and tire making the German practice was behind the American. Methods of making synthetic rubber were similar but the investigators concluded that, over all, the American industry was more highly developed. The tough, German Buna S was not as well adapted to volume production of tires as is GR-S. No detail was given since the findings have been published by the WPB and RRC.

During the course of the meeting an announcement was made to the effect that the main event of the group each year would be a golf outing in the Fall and that all efforts would be devoted to making this outing an outstanding success. Entertainment was furnished both during and after dinner. Incidentally, the pianist of a young soprano who sang popular musical comedy hits failed to make an appearance and an able job of substitution was performed by A. Yaroshefski of the Aldan Rubber Co.

The annual membership dues of the group have been continued at $1.00 and members who have not yet paid their dues for 1946 or new members wishing to join the group are requested to send such dues direct to the new treasurer of the group, W. B. Dunlap, Jr., c/o Lee Rubber & Tire Corp., Conshohocken, Penna.

Offer Surplus Goods

Nearly 800,000 pairs of heavy rubber gloves and over 130,000 rubber aprons, declared surplus by the Army, and which cost the government in excess of $1,600,000, are currently being offered to the civilian market through a national sale. The gloves are the heavy black gauntlet type, 14 inches long, and come in sizes from 10½ to 12. The aprons are made of olive green impermeable material, reach from the neck to below the knees, have long sleeves with snug fitting wristlets, and are impermeable to moisture and gas. The sale is being conducted through the 11 consumer goods regional offices maintained by the Reconstruction Finance Corporation.

Quebec Holds Ladies' Night

Approximately 250 members and guests, by far the largest attendance to date, attended the Annual Ladies' Night Meeting of the Quebec Rubber & Plastics Group, held in the Ritz Carlton Hotel, Montreal, Canada, on December 13. A. F. Caprio, of the Celanese Corporation of America, was the principal speaker, substituting for Dr. Marie Bentivoglio, of the same company, who was prevented from appearing due to illness. Mr. Caprio discussed the subject "What Can We Expect of Plastics," and handled it well. He also displayed numerous samples to indicate the great strides and wide variety of applications of plastics for both war and peace. A movie, "Proving Ground," was also shown. Entertainment was also furnished.

Akron to Meet February 1

The annual Winter Meeting of the Akron Rubber Group will be held on Friday, February 1, at the Mayflower Hotel at Akron. The program includes a talk on "Silicones—New Engineering Materials" by W. W. Pedersen and Philip Servais, of the Dow Corning Corp., Midland, Mich. Entertainment will also be provided.

CONNECTICUT RUBBER GROUP IN PROCESS OF FORMATION

A new local rubber group, presently in process of formation, is the Connecticut Rubber Group. A temporary executive committee was organized last October and the initial meeting of the group will be held on Friday evening, February 15, in the Bridgeport Public Library, Broad and State Streets, Bridgeport, Conn.

Members of the temporary executive committee include the following: Roger Bascom (Goodrich Chemical), Edward Butler (General Electric), Robert Holmes (Raybestos-Manhattan), Ralph Norton (Kerite Wire), Milton Greenhalgh (General Electric), George Sprague (Sponge Rubber Products), Hugh Allison (Allison Co.), George D'Olier (Raybestos-Manhattan), and Don Spengler (Sponge Rubber Products), Mr. Bascom is temporarily acting as chairman, Mr. Butler as treasurer, and Mr. Holmes as secretary.

Two speakers are scheduled for addresses at the initial meeting. They are Warren Lockwood, executive vice-president of the Rubber Manufacturers Association, New York, who will discuss the present and future availability of natural rubber and the eventual status of natural versus synthetic rubber consumption, and Dr. William Sparks, of the Standard Oil Development Co., Elizabeth, N. J., who will talk on "Synthetic Rubbers of the Near Future."

In addition to these talks, a short business meeting will be held to select a nominating committee which will at a later date present the new organization with a slate of permanent officers. Further information on the plans of the group can be secured by writing to the temporary secretary, Robert Holmes, c/o Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport, Conn.

Buffalo Names 1946 Officers

Election of officers at the Annual Christmas Party and Meeting of the Buffalo Rubber Group, held at the Hotel Westbrook in Buffalo on December 13, resulted in the following: *Chairman,* E. C. Siverson (Buffalo Weaving & Belting); *Vice-Chairman,* Edward Sverdrup (U. S. Rubber Reclaiming); *Secretary-Treasurer,* E. R. Briggs (Hewitt Rubber). The following were elected members of the Executive Committee: J. M. Cranz (Cranz Co.), G. Van Nimweggen (Carborundum Co.), and Edward Martin (General Cable). Approximately 80 members and guests attended the meeting which, in addition to the election, featured some fine entertainment and the distribution of prizes.

To Deal in Crude Rubber

George D. Boukouris has announced the formation of Boukouris & Co., Ltd., at 80 Broad St., New York 4, N. Y., to deal in crude rubber.

GOODRICH INSTALLS COLD ROOM AT ITS AKRON, OHIO, PLANTS

A new cold room in which rubber and synthetic rubber compounds and products of many types, plastics, and other materials can be tested at temperatures down to —90° F., has been installed by the B. F. Goodrich Co. at its Akron, Ohio, plants. Temperatures in the cold room can be varied from 50° F. to —90° F.

Thirty feet long and 15 feet wide, the cold room has five working units, each six feet square, cooled by a three stage compressor unit and a single stage compressor using Freon 12 and 22 as refrigerants. Each unit operates separately, with electrically controlled temperatures charted for a 24-hour study at different levels. The new unit is large enough to permit tests of equipment under temperatures found in the colder parts of the United States and Canada, as well as those encountered in high altitude flying.

Capable of taking a load of 250 pounds of rubber, synthetic rubber or plastics, 500 pounds of steel or 100 pounds of oil, each unit is equipped with a door having a non-locking catch, and an alarm operated from within the unit as further protection against locking in the operator. All operators wear electrically heated clothing. Four of the units have temperature ranges from 50 above to 65 degrees below zero, while the fifth has a range from 50 to 90 below.

The cold unit has 16 inches of insulation on the sides and top and 19 inches next to the floor. The large entry room is provided with a Niagara No-Frost unit to absorb all moisture, making it unnecessary to defrost the cold room.

Goodyear Buys New Factory

The Goodyear Tire & Rubber Co., of Akron, has purchased the two-story factory in Lincoln, Nebraska, in which the company built airplane bullet-sealing fuel cells during the war. Machinery and equipment necessary for the manufacture of V-belts and belting for tractor and other types of farm machinery has been ordered and it is expected that the plant will be in full operation within six months. The Lincoln plant was first occupied by Goodyear in December, 1943, and was known as its Lincoln division. The factory's 172,650 square-foot U-shaped building area has been supplemented by the purchase of an additional 17 acres adjoining the present site. Appointment of a plant superintendent has not as yet been made.

New Scrap Rubber Firm

Announcement has been made of the formation of the Chipco Rubber Co., 160 West 62nd St., New York 23, N. Y., by George Jatinen, formerly with A. Schulman, Inc. The firm will deal in scrap rubber.

SCHULMAN OPENS NEW SCRAP RUBBER PLANT AT LONG BEACH, CALIF.

A. Schulman, Inc., dealers in scrap and crude rubber with headquarters at Akron, recently announced the opening of a new plant at Long Beach, Calif., with H. L. Alden as branch manager and Russ Hartz as factory superintendent. The new plant is equipped with modern processing equipment and excellent service facilities. Mr. Alden, a graduate of Case School of Applied Science, had been with Firestone since 1925 serving as manager of various divisions of the company. More recently he was manager of the Material Handling Division for U. S. Rubber in Los Angeles. Mr. Hartz, the new factory superintendent, also started his career with Firestone in 1916. Before joining the Schulman organization last year, he was assistant division manager of the Stores and Byproducts Division of the company. The Long Beach plant was purchased from the Joshua Hendry Iron Works and occupies 4½ acres of land, with 26,700 square feet of floor space.

Break Ground for Laboratory

S. C. Moody, general manager of the Calco Chemical Division of the American Cyanamid Co., announced this month that ground had been broken for the first units of the new Research and Technical Sales Service Center at Bound Brook, N. J. The Center, when completed, will also include the general administrative offices of the company. Present plans call for the immediate erection of the application and technical sales service laboratory units, which are expected to be completed by the middle of next year. This unit will become the new quarters for the pigment, paper and textile resin sections of the application laboratory and the technical sales offices for this group.

Design Firm Changes Name

The Plant & Machine Design Company, 1201 Majestic Building, Detroit, Mich., operated by Samuel M. Renfrew and Roland I. Kuffler, both well known to the rubber industry as consultants in plant layout, calenders, tire building machinery, etc., has changed its name to Renfrew & Kuffler, Design, Engineers. The company has contributed many original ideas and designs toward the improvement and modernization of rubber plants and their equipment and intends to continue in this work.

Stoughton With Vanderbilt

Roy L. Stoughton has joined the laboratory organization of the R. T. Vanderbilt Co. at East Norwalk, Conn. Mr. Stoughton, a graduate of the University of New Hampshire, was with the Naugatuck, Cambridge and Mishawaka plants of U. S. Rubber for six years where he did development work on rubber products. Following that he worked for one year with DuPont, at Fairfield, Conn., on proofings, two years at Middletown Rubber on proofings and then five years with the United Aircraft Corp. on airplane propellers. Mr. Stoughton will be in charge of the newly equipped proofing laboratory at the Vanderbilt laboratory and will devote his time to development work on proofing.

Clark Joins Acorn Wire

Frank J. Clark, formerly technical supervisor of operations for the Anaconda Wire & Cable Co. at Pawtucket, R. I., has joined the Acorn Insulated Wire Co., Inc., Brooklyn, N. Y., as factory manager. Prior to being with Anaconda, Mr. Clark was associated with the General Electric Co., Bridgeport, Conn., as research and development chemist of the Wire and Cable Section and for 13 years was affiliated with the John A. Roebling Sons Co., Trenton, N. J., as development and control engineer.

GOODRICH BREAKS GROUND FOR NEW RESEARCH LABORATORIES

The B. F. Goodrich Co., which 50 years ago established the first research laboratory in the rubber industry, according to company officials, broke ground on January 3 for its new and complete research center. The ground-breaking ceremonies tied in with the observation of the 75th anniversary of the company. The new research laboratories, construction of which will be started shortly, will be erected on a 260-acre tract almost exactly halfway between Akron and Cleveland, near Brecksville. Present plans call for five separate air-conditioned buildings built of gray brick.

Outstanding characteristic of the new laboratories will be the adaptability for rapid conversion from one type of work to another. Removable partitions, interchangeable fixtures, and a wide variety of special services will be employed. The building site was chosen primarily because of its freedom from dust, cross-country electric lines, vibration and noise.

The main research laboratory and headquarters for basic research will be a T-shaped building, 202 feet across the front, 172 feet deep, and three stories tall. It will include 81 individualized laboratories, a cafeteria and a dining room, an assembly room with seating capacity for 250 people and an extensive technical library. The second building, also three stories, will house physical testing, chemical engineering research, complete shops, receiving and store rooms, and necessary power units. In this building company scientists will "evaluate the work done in fundamental research."

A special "high-pressure" building equipped with barricades and instruments for safety will be provided in which chemical reactions will be tested. There also will be a highly-ventilated building for research work in toxic materials and a separate building for storage of solvents. At the outset of operations in the research center the staff will consist of between 220 to 250 persons.

Original research laboratories of the company were established in Akron in 1895 by the late Charles C. Goodrich, son of the founder and brother of David M. Goodrich, chairman of the board of directors. The company has had but four research directors in the past 50 years. Dr. William C. Geer succeeded Mr. Charles Goodrich in 1908 and was followed by James W. Schade of Akron from 1925 to 1942 when Dr. Howard E. Fritz assumed the position.

Rayon Cord in Movies

To acquaint the public with the imminent advent of rayon cord tires, Industrial Rayon Corp. of Cleveland arranged for a filming of the use of this synthetic in tires as part of a recent MGM "News of the Week." The film was made under the supervision of Bernard Lewy, advertising director for Industrial Rayon.

Organize New Wire Concern

The U. S. Wire & Cable Corp., 744 Broad St., Newark 2, N. J., has been organized for the manufacture of bare and insulated wires. Both rubber and plastics will be used for insulation materials. The new concern is headed by I. Arthur Levy as president, Armand Sequeira as vice-president and treasurer, and M. J. Silva as secretary. Mr. Sequeira has been associated with the research laboratories of the General Cable Corp. for the past few years. Prior to joining General Cable he was with the Cornish Wire Co. as plant manager of its Williamstown, Mass., plant for three years, and the Circle Wire & Cable Corp. for five years.

Increases Holdings in Mansfield

General Tire & Rubber Co., Akron, has increased its minority holdings in the Mansfield Tire & Rubber Co., Mansfield, Ohio, according to an announcement made by officials of both companies last month. General Tire had previously purchased 25% of Mansfield stock and with the new purchase becomes "a substantial minority stockholder" in the company. Under the new arrangement, General and Mansfield will cooperate closely in the fields of research, engineering and technical development. Management of the Mansfield firm will remain unchanged with George W. Stephens as president.

Palmer Receives Scroll

Dwight R. G. Palmer, president of the General Cable Corp., has been awarded a scroll of tribute by the War Department for his patriotic services, including production of 80 per cent of the field wire procured by the Army Signal Corps in World War II. The citation, said to be the only one of its kind, was presented in recognition of Mr. Palmer's achievements in breaking a serious bottleneck in war production in developing substitutes for rubber insulation before the need for them became apparent and other valuable services.

Group Buys Lee-Tex Plant

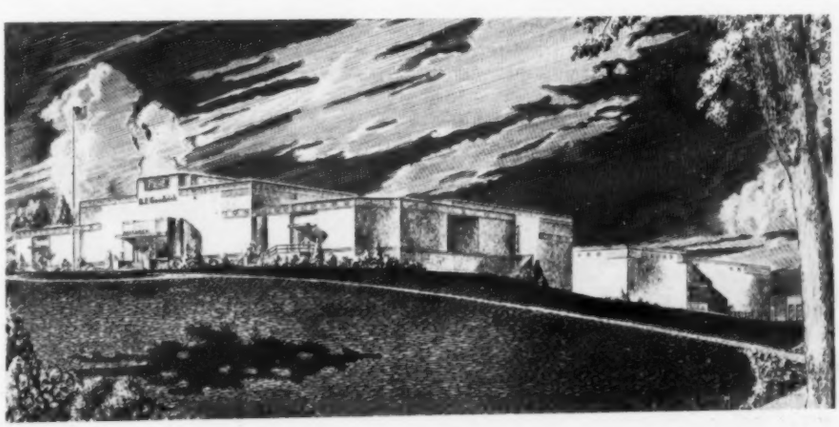
The Lee-Tex Rubber Products Co., 904 Blackhawk St., Chicago, Illinois, has been purchased by James B. Mullen, former sales manager, and Carl Winstel, former foreman, of the Oak Rubber Co., Ravenna, Ohio. The two Oak men acquired all equipment of the Chicago plant and leased the building in which it is located. The eleven-year-old company is one of the seven plants in the country manufacturing toy balloons. Mr. Mullen is the new president of the Lee-Tex firm, while Mr. Winstel will serve as secretary, and H. W. McConnell as treasurer and sales manager.

Reclaimers Elect New Officers

At the annual meeting of the Rubber Reclaimers Association, held on January 8 at the Biltmore Hotel, New York, William Welch, president of the Midwest Rubber Reclaiming Co., was elected president of the Association. Fred Traflet, of the Pequanoc Rubber Co., was named vice-president and Charles T. Jansen, of the Wilmington Chemical Co., secretary-treasurer. The new executive committee consists of Jean H. Nesbit (U. S. Rubber Reclaiming), chairman, R. E. Casey (Naugatuck), and Allyn I. Brandt (Goodrich Chemical).

Makes New Zealand Deal

An arrangement has been reached between the B.F. Goodrich Co. and the Reid New Zealand Rubber Mills, Ltd., of Auckland, New Zealand, under which the American concern will supply technical help and engineering services for the New Zealand organization. The Reid Mills, said to be the largest rubber manufacturing concern in the Pacific Islands, has increased its capitalization from approximately $1,000,000 to $4,000,000, and plans to enter the tire and tube field, with an annual output of around 150,000 units. Present production is limited to mechanical goods and tire repair materials.



View of the new and complete Goodrich Research Center.

PLASTICS GROUP REPORTS ON SUPPLY OUTLOOK FOR 1946-47

Authentic estimates of the current, immediate future, and long-range availability of plastic materials are now possible from an extensive survey of the members of the Plastics Materials Manufacturers' Association, just completed.

Many molders, fabricators, and ultimate consumers, who have questioned reports from outside the association, will be interested in the steps being taken to supply them with material in the required amounts, as indicated by the survey. From these new estimates of current supply and of the manufacturers' expansion programs for the next two years, it is evident all segments of the industry can continue to plan on materials being available. Engineers, in particular, drawing up plans for future use of plastics will find these estimates reassuring.

One of the most important phases of the supply picture of interest to the entire plastics industry is the expansion programs now being undertaken by many material manufacturers. Generally, it can be said that manufacturers of most of the newer types of plastics, who did not make large expansions during the war years, are now planning additional facilities for their respective materials. Many of these expansions have already been announced to the industry, and others are still pending.

A conservative estimate of the plans of the association members alone is that new facilities for production of plastic materials will entail expenditures amounting to $102,000,000 during 1946 and the early part of 1947. A major portion of these new facilities will be for the production of molding materials. This, in itself, is the best example of the optimism of the material manufacturers for continued growth of the plastics industry, and is indeed a challenge to the entire industry to see that these materials are used to advantage.

Completion dates of new facilities vary considerably. Whether or not any given expansion program can be carried out on schedule depends upon building material supply, building labor, and the ability of the equipment manufacturers to turn out special types of equipment required in a reasonable time. Barring unforeseen delays, many of the expansion programs will become effective in the spring of 1946 and thereafter through the middle of 1947. In the detailed discussion of the availability of the various materials, increased supplies from new facilities are mentioned by dates whenever practical.

One of the most disturbing factors in the present supply situation is the availability of labor. Generally, the supply is extremely critical in areas in the east and New England. In other areas, there is sufficient labor to operate plants at or near capacity. Where labor is tight, the manufacturers are operating longer work weeks and using all possible means to maintain full production schedules. However, the urge to work overtime, especially on Sundays, is no longer a production aid. This complicated situation may well account for the fact that some molders are not obtaining what they consider is their rightful share of any given producer's production at this time.

Manufacturers of phenolic molding materials are being severely hampered by shortage of wood flour. It has been extremely difficult for the last two or three months to obtain good quality material in sufficient quantities. Continued strikes in the lumber industry on the West Coast and the insufficient conversion capacity in this country may eventually choke off the supply. It is hoped improved labor situation and possible resumption of wood flour imports from the Scandinavian countries will relieve this shortage.

A strike in the steel industry would eventually slow down coking ovens, thus curtailing tar acids supplies. These labor difficulties, together with shortage of labor in the material manufacturers plants and in many of the molders and fabricators plants, are and may continue to materially restrict the amount of plastics that are actually consumed.

Other material shortages are insufficient supplies of cellulose acetate flake, for which ample expansion of facilities is now going forward; critical supply of cotton waste, which could restrict production of impact materials should the demand become heavy; and possible uncertain supplies of coloring pigments for styrene molding materials when the large expansion of this plastic becomes effective.

Veteran Employment

Returning veterans and displaced war workers who are scientifically and professionally qualified and who are seeking employment in industry, research institutions, colleges, etc., are offered the help of the National Roster of Scientific and Specialized Personnel, 1006 U St., N.W., Washington 25, D. C. Separation centers of the Armed Forces are cooperating with the National Roster to assist qualified veterans to find employment in civil life. All employers who are not able to retain their full staffs and who wish to assist those of their professional employees who are leaving are asked to advise these individuals to ask aid of the Roster. On the other hand, employers who are in need of additional personnel are invited to send to the Roster descriptions of the positions which they wish to fill, together with detailed requirements as to age, extent of education, experience, etc.

A compact aircraft brake with a "built-in cooling system," which permits high kinetic energy values per pound of brake weight, has been developed by Firestone.

REPORT IS ISSUED ON JAPAN'S RUBBER INDUSTRY

According to a recent report made by the scientific and economic advisers to the occupying American forces in Japan, production of synthetic rubber has been completely abandoned by the Japanese and machinery in that country's eight synthetic rubber plants, including the raw materials plants, lies idle due to the shortage of raw materials and fuel and to the prohibitive production costs. These costs were placed at approximately 100,000 yen a ton by the American investigators. Before the war the yen was worth about 20c in American money.

Encouraged and subsidized by the Japanese army and navy and devoted entirely to production of goods for them, synthetic rubber was put to its greatest use in making self-sealing tanks. It was intended to supplement, not to replace, natural rubber.

Japanese figures for synthetic rubber production, which were not considered accurate by the American observers, indicated an annual capacity for the eight plants of 750 tons. Actually, 1944 production was only 220 metric tons and the total output for the 1941-45 period was 356 metric tons, the report said.

Complete data on all of the eight plants was not reported. However, Mitsubishi Chemical Industries, reporting on two of the eight plants, listed one using the alcohol process and another using the monovinylacetylene process.

The monovinylacetylene plant's planned monthly production capacity was 20 tons of butadiene, 7 tons of acrylonitrile and 15 tons of synthetic rubber. Actual production, according to the report, was 3 tons of synthetic rubber per month.

The alcohol plant had a planned monthly production capacity of 30 metric tons of butadiene, 10 tons of acrylonitrile, and 25 tons of synthetic rubber. Actual production, had only reached 13 tons of butadiene, 7 tons of acrylonitrile, and 10 tons of synthetic rubber.

There are 341 rubber products factories in Japan with an aggregate consumptive capacity for crude rubber of 32,066 metric tons. Of these, 35 are tire factories with an annual crude rubber consumption capacity of 8,929 metric tons, the report said.

Form Shell Chemical Corp.

In preparation for a planned expansion program, the Shell Chemical Corporation has been organized for the purpose of taking over and continuing the business of the Shell Chemical Division of the Shell Union Oil Corp. The new concern, which will be operated as a wholly-owned subsidiary of the Shell Oil Co., Inc., will have its headquarters at the Shell Building, San Francisco, and will maintain a New York office at 500 Fifth Avenue. It will take over the operation of various chemical plants operated by the parent concern, including the butadiene plant operated at Torrance, Calif., for the Office of Rubber Reserve, R.F.C.

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• A COLUMBIAN COLLOID •

4 OUT OF 5 SMOKE A DAY

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STATEX-B

for HEAVY DUTY TREADS *and* INSIDE TIRE PARTS

Statex-B with an area of 8 acres per pound produces better reinforcement than a blend of EPC and HMF showing the same heat build-up. Statex-B has a narrow range of particle sizes — there are no coarse particles to reduce reinforcement or extremely fine particles to develop heat.

Compounders who employ Statex-B to offset the heat build-up characteristics of GR-S do not compromise with quality. In blends of EPC and HMF tensile is toward the 6 acre carbon and heat build-up toward the 10 acre channel black.

Increased production makes Statex-B generally available. It is no longer necessary to accept compromise—use Statex-B for heavy duty treads, cushions and top-ply carcass compounds.

•

FURNEX *The High Resilience Carbon*

MICRONEX *For 30 years the Standard Reinforcing Carbon*

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SECTIONAL DRIVE DEVELOPMENTS STRESSED IN ANNUAL G-E REPORT

Several interesting engineering developments in sectional drives for rubber, linoleum, plastics and similar industries, were recorded during 1945, according to the annual review of electrical developments issued by the General Electric Co., Schenectady, N. Y.

In the tire industry, for example, where line-shaft drive was previously the conventional type, a complete electric sectional drive was being introduced for a 32-in. by 70-in. four-roll calender with processing auxiliaries. The calender coats both sides of the tire fabric with rubber. One advantage of the new drive will be that measurements and control of tension throughout the calender processing line are possible.

All four rolls of the calender are synchronized mechanically through gears. The calender drive itself includes a 350-hp d-c motor with a 300-kw motor-generator set. Operating speed range will be from 7 to 70 yd per min. The auxiliary motors, from 2 to 25 hp, are connected to three small generators for independent adjustable voltage control of each group of motors.

Speed of the drive motor will be controlled by a combination tube-amplidyne regulator, and most of the auxiliary motors will have constant-current regulators to provide constant tension. In all, 11 amplidynes will be used, as well as two booster-generators and one bucking exciter.

Of particular interest will be the use of separate 200-hp 164-rpm gear-motors to drive each of the two rolls in an experimental plastics mill. (The motors themselves will operate at 1150 rpm, 230 volts d-c.) Special electronic control will hold the speed of each roll constant at any particular setting. In order that laboratory investigations can be made as to optimum speed difference between the two rolls for milling any particular plastic, the speed adjustments are independent.

Two production mills also under construction have the rolls connected through gearing. These rolls are driven by a 200-hp 90-rpm synchronous gear-motor that has a motor speed of 900 rpm.

Silicone rubber had been previously announced, with its applications limited for production reasons to heat-resistant gaskets for war-essential turbo-superchargers and Navy searchlights, services in which rubber could not withstand the temperatures. Last year, silicone rubber attained prominence as a high-temperature electrical insulation. Several formulations were developed, all with excellent insulating properties and all such that they may be processed on the usual rubber-fabricating equipment.

Particular applications in the wire-coating field exhibited dielectric strengths above 500 volts per mil (in other insulations a dielectric strength of only 400 volts per mil was good) over a wide range of frequencies, together with adequate adhesion of the silicone rubber to metal, and adequate strength and flexibility.

Production was on a pilot-plant scale, but the material was made available for special applications requiring its chemical inertness and its ability to withstand temperatures of nearly 400°F. (200°C.).

Sun Chemical Acquires Warwick

The Sun Chemical Co., New York City, the recently adopted name of the former General Printing Ink Corp., has acquired the Warwick Chemical Co., manufacturer of a diversified line of industrial chemicals, including specialized waxes, with plants at West Warwick, R. I., Wood River Junction, R. I., and Rock Hill, S. C. The Warwick company will become an integral part of the fine chemicals division of the parent concern and will be operated under the name of the Warwick Chemical Co. Division of the Sun Chemical Co. William F. Talbot, head of Sun Chemical's Fine Chemicals Division, will be in charge of the Warwick activities. Sun Chemical also recently acquired the A. C. Horn Co., manufacturers of paints, varnishes and "Horn-Kem" latex dispersions.

PRODUCTION OF CASINGS INCREASED 36% IN OCTOBER

Production of automotive pneumatic casings by American manufacturers increased more than 36% in October over the preceding month, while shipments increased at the rate of 26.8%, according to the latest statistical report of the Rubber Manufacturers Association. Exports, however, continued to lag far behind 1941 rates. Passenger casing production was up 39.5% while truck and bus was up 29.0% to approximately the August level. Output of passenger, truck and bus tubes was up 39.6%.

While passenger tire production climbed to 3,627,221 units in October, it was noted that production is still running short of capacity. The association said this was due principally to the manpower shortage. The industry needed approximately 7,000 additional workers in October. This combined with the six hour working day operative in many plants left passenger tire production 2,372,779 units short of the industry's estimated capacity of 6,000,000 tires a month. In line with this increased production, October shipments of passenger casings were up 29.1% over September, and truck and bus casings were up 20.6%. Tube shipments increased 28.1%.

Shipments for export of all types of casings, with the majority in truck and bus sizes, amounted to 53,219 units in October and represented less than 1¼% of total shipments. For the first ten months export shipments amounted to 374,897 casings compared with 1,367,766 casings in the same period in 1941.

Manufacturers' inventories were ahead of September in two categories: passenger tires up 29.4%; tubes up 17.3%. Inventories of truck and bus casings were down 4.4% as the result of heavy domestic shipments.

The report covers only automotive pneumatic casings and tubes. It does not include any solid tires, or pneumatic tires for motorcycles, bicycles, or for aviation, agriculture or industrial equipment.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those listed in our preceding issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue.

X Number Designation	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X=278	U. S. Rubber Naugatuck	12/6/45	50/50 butadiene-styrene ratio, sodium oleate and glue emulsifiers, shortstopped with hydroquinone, 2 parts PBNA antioxidant, alum coagulated.	Use in closure and sealant compounds.
X=280	Goodrich Port Neches	12/18/45	Same as X-244, except water content of charging recipe is reduced from 180 parts to 165 parts.	Same purpose use as X-244.

NAMES IN THE NEWS

DR. WILLIAM I. HARBER, formerly head of the Organic Products Department of the Witco Chemical Co., has joined the staff of Johan Bjorksten, industrial research chemist, Chicago, as senior organic chemist.

COL. CLARENCE E. DAVIES, secretary of of the American Society of Mechanical Engineers, New York, has been awarded the medal of the Legion of Merit for meritorious service while on active duty with the Ordnance Department of the Army.

JOHN O. LOGAN, associated with the Mathieson Alkali Works, New York, since 1931 when he joined the organization as a research assistant, has been appointed an assistant general manager of sales for the company.

W. J. SMITH, formerly department foreman of final fitting and testing of Corsairs of the Goodyear Aircraft Corp., has been named division superintendent of the tire plant at Sao Paulo, Brazil, operated by the parent Goodyear concern. H. E. Schroeder has been named technical service manager at the same plant.

JOHN L. COLLYER, president of the B. F. Goodrich Co., Akron, was recently elected a director of the financial house of J. P. Morgan & Co., Inc., New York.

DR. W. ALBERT NOYES, JR., chairman of the chemistry department of the University of Rochester, has been elected president of the American Chemical Society for 1947. He will serve as president-elect during the current year.

DONALD SIMONDS, a member of the laboratory and technical sales staff of Godfrey L. Cabot, Inc., Boston, before joining the Navy in June, 1942, has been honorably discharged with the rank of Lieutenant (Senior Grade) and has rejoined the Cabot sales staff.

L. C. BOOS, formerly vice-president of the U. S. Rubber Export Co., Ltd., has been elected president and general manager of that concern. HERBERT G. KIESWETTER, assistant general manager, was elected vice-president.

F. WILLIAM MCMILLAN, associated with the Firestone Tire & Rubber Co., Akron, for the past nine years, has been named chief chemist of the International Plastic Corp., Morristown, N. J.

CARL NESSLER, until recently associated with the Home Products International, Ltd., a division of the American Home Products Corp., has joined the J. T. Baker Chemical Co. as export manager.

WALLACE E. CAKE, director of the plantation research department of the U. S. Rubber Co., and associated with that company since 1922, has been appointed assistant managing director of the company's plantation division.

JOHN R. HOOVER, general sales manager, plastics materials, B. F. Goodrich Chemical Co., Cleveland, was recently re-elected as vice-president of the Plastic Materials Manufacturers Association, Inc.

MAJOR EDWIN L. HOBSON, III, chief of the Plastics Section, Research and Development Branch, Office of the Quartermaster General, has been awarded the Legion of Merit for directing the developmental work which resulted in widespread use of plastics in many different military items in World War II, including processes for treating raincoats.

JOSEPH A. NEUBAUER, formerly superintendent of the chlorine producing works at Natrium, West Virginia, operated by the Columbia Chemical Division of the Pittsburgh Plate Glass Co. for the government, has been named technical adviser to the Columbia Chemical Division. He will make his headquarters at the Pittsburgh office.

GEORGE W. STEPHENS, president of the Mansfield Tire & Rubber Co., was recently awarded the Gold Membership Emblem of the Army Ordnance Association. The awards are based on efforts in spreading knowledge of ordnance preparedness.

HERMAN F. STAFFORD, wartime rubber director of the United States Ordnance Department with the rank of Brigadier General, and who holds both the Distinguished Service Medal and the Legion of Merit, has been elected executive vice-president of the Ohio Rubber Co., Willoughby, Ohio.

ROBERT P. RUSSELL, head of the research organization of the Standard Oil Co. (N. J.), has been awarded the 1946 gold medal of the American Institute of Chemists, for research contributions to the war effort, including development of a catalytic process for making butadiene from petroleum.

K. J. SOULE, formerly assistant chief chemist of the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J., has been named manager of laboratories of that division.

T. G. GRAHAM, vice-president in charge of manufacturing of the B. F. Goodrich Co., recently completed 20 years of service with the company and was awarded a 20-year service pin.

DR. LAVERNE E. CHEYNEY, formerly section manager in the Chemical Products Development Division of the Goodyear Tire & Rubber Co., Akron, has joined the staff of the Battelle Memorial Institute, Columbus, Ohio, where he will be associated with its division of organic chemistry and will specialize in rubber technology.

ERNEST J. GOTTFRIED, a member of the Fawick Airflex Co., Inc., who recently returned from Russia where he spent 18 months with the Russian Navy installing Fawick clutch-equipped G. M. Diesels in naval craft, has been appointed service manager of the company. He will make his headquarters at the general offices in Cleveland.

S. I. STRICKHOUSER, formerly research and development manager of the Providence, R. I., plant of the U. S. Rubber Co., has been named assistant manager of that plant. DR. ROSCOE H. GERKE was appointed research and development manager of the plant.

JOHN G. AUGENSTEIN, formerly chief chemist of the Pequanoc Rubber Co., has joined the laboratory staff of the U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y., in the same capacity.

C. F. "CY" JOHNSON, who has specialized in the manufacture and sale of valves for the past several years, has joined the Watson-Stillman Co., Roselle, N. J., where he is in charge of all engineering in the Forged Steel Fitting and the Bronze and Forged Steel Valve Divisions.

RALPH R. ROGERS, president of the Armstrong Rubber Export Corporation, of New York, was recently elected president and general manager of the Indian Motorcycle Co., Springfield, Mass.

JOHN L. DEFANDORF, who has been associated with Cutler-Hammer, Inc., Milwaukee, Wisc., since 1917, and whose experience with the company has covered almost every phase of industrial activity, has been appointed general engineering supervisor over the company's rubber mill, synchronous motor, valve control, public works, short orders, textile, paper, and printing equipment divisions.

C. J. WIBBELSMAN, who was associated with the U. S. Rubber Co. for many years, acting as plant controller of both the Eau Claire and Chicopee Falls factories at various times, was recently elected vice-president in charge of operations of the Personal Products Corp., a subsidiary of Johnson & Johnson.

Proctor & Schwartz, Inc., Philadelphia, Penna., manufacturer of drying machinery, has opened a new branch office in the Wilder Building, Charlotte, N. C., under the direction of Maj. John R. Schenck.

IMPORTANT EXPANSIONS SET BY GOODYEAR TIRE & RUBBER

Announcement of three specific steps in an over-all expansion program planned by the Goodyear Tire & Rubber Co. has been made. The three steps are: (1) Creation of the Chemical Products Division, with C. P. Joslyn as manager; (2) Construction of a $1,000,000 Chemical Products Division Development Laboratory, with Dr. C. W. Walton as manager; (3) Construction of a $3,000,000 plant in Akron for the conversion of vinyl chloride copolymers and other resins into films, sheets, etc.

Ground has already been broken in Akron for the construction of the new laboratory and sales offices, while the conversion plant, to be located near the laboratory, is now in the design stage with a prospect of being under construction within a few months. It was explained that whereas the Goodyear Research Laboratory, built in 1943, will confine itself to the creation of new materials in the field of natural and synthetic rubber and plastics, the task of exploring the usefulness of these new materials will be turned over to the new development laboratory.

The new laboratory will be a two-story U-shaped structure of brick and stone. It will have space for about 75 scientists as well as necessary space for clerical work, etc. In addition it will house the sales force of the Chemical Products Division and engineers of the Goodyear Chemical Engineering Division, a group concerned with pilot plant design and operation. Dr. Walton, manager of the new laboratory, during World War II directed the transition to production of the method for converting the polymerization of GR-S from a batch operation to a continuous process.

As explained by Dr. R. P. Dinsmore, Goodyear vice-president in charge of research and development, the new Chemical Products Division Development Laboratory will be concerned with four major functions, namely, product development, sales development, technical sales service, and production technical service. The sales development program has been split into four chief fields: Pliofilm, plastics and coatings, Airfoam, and builders' supplies and floorings.

Artist's conception of the new $1,000,000 Development Laboratory of the newly-created Chemical Products Division of the Goodyear Tire & Rubber Co. Ground has already been broken in Akron for the two-story U-shaped structure.

General in Refrigeration Field

The General Tire & Rubber Co., Akron, and the Liquid Carbonic Corporation, Chicago, in a joint statement, recently announced the formation of Frostor and the coming introduction of the first new combination refrigerator and freezing unit for the home. Frostor has opened executive offices at 332 South Michigan Ave., Chicago, Ill. A million dollar factory is under construction at Morrison, Ill. Max M. Gilman, who recently joined General Tire as assistant to the president, has been named general manager of the new company.

Firestone Leases Pottstown Plant

The Firestone Tire & Rubber Co. has leased the government-owned plant at Pottstown, Penna., from the RFC for a period of three years and two months. Reconversion of the plant, used for the production of airplane engines during the war, into a tire factory is already under way, and actual tire production is planned early in the spring. The plant will have a daily output of from 6,000 to 8,000 passenger tires and a similar number of tubes. Firestone will occupy from 600,000 to 700,000 square feet of floor space.

Schedule A.S.T.M. Meetings

The Executive Committee of the American Society for Testing Materials has confirmed an earlier decision to hold the 49th Annual Meeting of the Society in Buffalo from June 24 to 28, 1945, and in conjunction therewith to have the 7th Exhibit of Testing Apparatus and Related Equipment. The 1946 Spring Meeting of the Society will be held in Pittsburgh during the week of February 25 to March 1. This will also be A.S.T.M. Committee Week, during which various technical committees will hold sessions.

Thomas Gets New Post

R. J. Thomas, who has been serving as president and treasurer of the Seiberling Rubber Co. of Canada, Ltd., has succeeded W.A.M. Vaughan, who has retired as vice president and treasurer of the parent Seiberling Rubber Co. at Akron, Ohio. Mr. Thomas, associated with Seiberling of Canada for 19 years, will continue to serve as treasurer of that company. Mr. Vaughan, whose retirement was forced by ill-health, joined Seiberling as treasurer when the company was founded in 1921.

New Pigment Concern Formed

The Kroma Chemical Co. was recently organized at Raritan, N. J., for the manufacture of a complete line of pigment dispersions in both water and organic soluble vehicles, which are concentrated pigment pastes compatible with coating compositions and cements of the synthetic rubber and vinyl type. The organizers of the new concern are John S. Booth, who will be in charge of plant operations; Edward J. Sheridan, in charge of sales promotion and Francis J. Tuttle, in charge of technical development.

Eclat Resumes Production

Eclat Rubber Co., Cuyahoga Falls, Ohio, has resumed production of its juvenile rubber tiring for youngsters' wheel goods. In addition, the company will manufacture its regular line of garden hose, general purpose tubing and special extruded items. Eclat, which had been in operation since 1919, halted its civilian production in 1942 when the plant was made available for war work. C. E. Reiss is president of the company; J. E. Smith, vice-president, C. M. Wernig, sales manager, and P. F. Forshey, plant superintendent.

Absorbs Philadelphia Rubber

The B. F. Goodrich Chemical Co., Cleveland 15, Ohio, has absorbed the Philadelphia Rubber Works, both companies being subsidiaries of the parent B. F. Goodrich Co. In the future, Good rich Chemical will direct both the production and sale of Philadelphia reclaimed rubber. The personnel of the reclaim division will continue in the same capacities as they have in the past. Sale of reclaimed rubber will be combined with that of other products featured by Goodrich Chemical.

FINANCIAL NEWS

FIRESTONE TIRE & RUBBER CO. REPORTS INCOME OF $16,446,735

Net income of the Firestone Tire & Rubber Co. for the year ended October 31, 1945, amounted to $16,446,735, after providing for all expenses, including $30,242,337 for depreciation and amortization and $65,789,178 for taxes. This is equal to $7.42 a share on the common stock and compares with $16,310,845, or $7.34 a share, reported for the previous fiscal year. For the seventh consecutive year, all previous sales records were exceeded, total sales amounting to $681,744,072, an increase of 4.6% over the $651,410,411 in 1944.

Profit from operations, after the deduction of cost of goods sold, depreciation and amortization, and selling, administrative and general expenses, amounted to $58,714,805. Total income, including $1,652,107 in interest, income from investments, etc., amounted to $60,366,912.

The consolidated balance sheet as of October 31, 1945, indicated total current assets of $181,600,349, including $28,512,158 in cash, $68,426,722 in accounts and notes receivable, $81,851,590 in inventories, and $2,809,879 in excess profits tax refund bonds. Total current liabilities amounted to $42,593,709, including $1,914,377 in foreign bank loans, $14,711,087 in accounts payable (vendors), $15,025,620 in other payables and accrued items, and $10,942,625 in accrued taxes.

A statement accompanying the report revealed that net profits of $3,858,931 from foreign subsidiaries were included in earnings; that the company's total investment in foreign countries is now $34,801,839; that the $75,000,000 revolving credit which was arranged with the banks in August, 1944, for the purpose of providing war and reconversion financing, was terminated last October; and that production of rubber at the Firestone Plantations in Liberia amounted to over 40,000,000 pounds in the fiscal year.

NET PROFIT OF $223,052 REPORTED BY NORWALK TIRE

Norwalk Tire & Rubber Co. reports a net profit of $223,052, equal to 95c a share of common stock, for the fiscal year ended September 30, 1945, which compares with $156,142, or 62c a share, for the previous fiscal year. The 1945 profit was after all charges, including provision of $574,300 for taxes, while only $368,000 was provided for taxes in the previous report. Total income for 1944 amounted to $800,934 compared with $561,753. Net sales for the fiscal year ended last September amounted to $8,827,507, a substantial increase over the $6,359,590 recorded for the 1944 period.

According to a statement accompanying the report, the company's unamortized balance of emergency facilities amounted to $128,076 on September 29, 1945. It has elected to claim this amount as accelerated amortization. Of this amount, $90,087 is applicable to the current year and was charged to cost of sales, and the balance of $37,988 applicable to the prior year, less $32,000 claim for refund of excess profits tax, was charged to other deductions.

Pharis Tire & Rubber Co.

Year Ended Oct. 31: Net profit of $145,193, based on net sales of $13,215,908, which compares with $412,660 and $11,830,519 for the previous fiscal year. A total of $405,921 has been set aside from current profits for amortization of emergency facilities.

Dayton Rubber Manufacturing Co.

Nine Months to July 31: Net profit of $646,676, equal to $2.55 each on 226,671 common shares, based on net sales of $19,304,156. No comparison with the corresponding period in the previous year is available.

Moves Executive Offices

Industrial Rayon Corporation has transferred its executive offices from West 98th St. and Walford Ave. to 660 Union Commerce Building, Cleveland, Ohio. The move was made to provide additional space for the engineering and mechanical development staffs which have been increased to handle the planning of a new plant which the company has announced and for special work in connection with the sale of patent rights of its continuous rayon process in foreign countries.

Parsons Retires from A. C. S.

Dr. Charles Lathrop Parsons, secretary of the American Chemical Society since 1907 and its business manager since 1931, has retired from both offices. Now 78, and one of the most widely known members of the American chemical profession, Dr. Parsons will continue to serve the society however, having recently been elected to the board of directors for 1946.

Price of Carbon Black

Although our Chemical Markets Page for the past few issues has indicated lower prices, the price of channel carbon black has been 5¼ cents per pound, bags, carload lots, f.o.b. plant, since October 1, 1945, under OPA regulation.

Rubber Union Holds Meeting

Included among major actions taken at the Tenth Annual Convention of the United Rubber Workers of America (CIO), held last month in Grand Rapids, Mich., was a decision to enlarge the activities of the union and approval of a change of name to the United Rubber, Cork, Linoleum & Plastic Workers of America. Although some dissension within union ranks was evident at the meeting, the delegates were united on a demand for a 30c-an-hour increase and demands for such increase will shortly be presented to various manufacturers by local unions. L. S. Buckmaster, who was selected by executive committee appointment to succeed Sherman H. Dalrymple as president when the latter resigned a few months ago, was elected to his first full term in that office.

Auburn Acquires Nic-Co Plant

The Auburn Rubber Corporation, Auburn, Indiana, according to G. E. Yoquelet, treasurer, has taken over the Nic-Co Rubber Co., Connellsville, Penna., and will continue to operate the Connellsville plant as a branch operation. Auburn will manufacture soles, heels, soling slabs, toys and patches at the Connellsville plant, although main offices and purchasing will remain at Auburn, Indiana.

Hewitt Buys Robins Conveyors

Hewitt Rubber Corp., Buffalo, N. Y., has announced that it has now acquired all the outstanding capital shares of Robins Conveyors, Inc., Passaic, N. J., manufacturer of materials handling systems. In making the announcement Thomas Robins, Jr., president of Hewitt Rubber, forecast an increase in sales of mine conveyors and said the company was ready to put on the market a new unit to speed unloading of coal cars.

ASTM Group Plans Symposium

An early meeting featuring a symposium on "The Effect of Low Temperatures on Materials" is planned by the Philadelphia District of the American Society for Testing Materials. Four papers will be included dealing with ferrous and non-ferrous metals, one on plastics, and one on rubber and rubber-like materials. Further details of the meeting will be announced shortly.

Form All-Top Rubber Co.

The All-Top Rubber Products & Specialty Co. has been organized at 354 Halsey St., Newark 2, N. J. Wallace J. Crowley is president of the company; O. S. Edmiston, Jr., vice-president, and Robert J. Heiney, secretary-treasurer. The new company will manufacture household specialties and has also set up a department for custom grinding of rubber to specifications.

New Firm Buys Anaconda Plant

Sale of the Pawtucket, R. I., plant of the Anaconda Wire & Cable Co. to a newly-formed Pawtucket firm, the Narragansett Wire Co., with a capital stock of more than $500,000 was disclosed recently. The purchase price is believed to be about $500,000. The new company, headed by William R. Morley, formerly general manager of the Anaconda plant in Pawtucket, was formed to engage in the manufacture of wire, wire cable, allied products and general products. Its articles of incorporation also set forth that the company may engage in the manufacture and sale of textile products. The capitalization includes 5,000 shares of preferred stock at $100 a share, and 1,000 shares of common stock of no par value. The common stock is designated as the sole voting stock, and may be issued for cash, services or property, while the preferred stock will carry a dividend at the rate of 4½ per cent, and is callable by the corporation at any time following two years after the issue. The dividends are to be cumulative and the holder will be paid $105 a share in the event the stock is called

DC Mold Release Fluid

The availability of DC Mold Release Fluid, a new silicon lubricant which reduces the friction between molds and rubber and plastic materials, improving plastic flow, reducing surface striation, and affording easy release from the mold, has been announced by the Dow Corning Corp., Midland, Mich. The number of moldings which can be made before it becomes necessary to re-treat the mold depends upon the speed of the cycle, the nature of the plastic material used, and the contour of the mold. On a fast cycle of 30 to 45 seconds, it may be necessary to re-treat the mold every 10 to 15 minutes. The new lubricant is reported to be especially effective in the injection molding of a wide variety of plastic materials, including the synthetic rubbers. It adheres preferentially to metal and does not vaporize, carbonize or change appreciably in consistency at molding temperature.

Acquires Hodgman Saran Division

The American Hard Rubber Co., New York City, has acquired the entire Saran Division of the Hodgman Rubber Co. of Framingham, Mass. S. J. Smith, who has been with the American Hard Rubber Co. for many years, will head the new Saran Division. Expansion of facilities is contemplated and the company will extend their field of plastics manufacturing to include not only Saran but Tenite, Lucite, Polystyrene and other thermoplastics. American Hard Rubber has been one of the earliest licensees under the Dow patents and is no newcomer to the Saran field.

Crossley Joins Caldwell Co.

Robert H. Crossley

Robert H. Crossley, formerly Butaprene sales manager for the Firestone Tire & Rubber Co., Akron, has joined the Caldwell Co., Akron, as technical director. He will also be engaged in the sale of the company's various products. Mr. Crossley, a graduate of Ohio State University in 1934, was with Firestone and the Xylos Rubber Co., a Firestone subsidiary, as analytical chemist, compounder, research chemist and control and development chemist. He is a member of Section IV on Rubber Products of Technical Committee A on Automotive Rubber of the A.S.T.M., and of various rubber groups, and has a number of technical publications to his credit.

Wanamaker Receives Promotion

C. L. Wanamaker, formerly general manager of the munitions division of the U. S. Rubber Co., has been named production manager of the company's tire division with headquarters at Detroit. At the same time announcement was made of the appointment of Curtis L. Moody and J. A. Daly as assistant production managers for the tire division and Frank L. Swanson as factory manager of the Detroit tire plant. All of these men have been affiliated with U. S. Rubber in various capacities over a period of years.

Lundquist Joins Muehlstein

Dave Lundquist, who recently resigned as vice-president of A. Schulman, Inc., has joined H. Muehlstein & Co., Inc., scrap rubber dealers, with headquarters at 122 E. 42nd St., New York 17, N. Y. Mr. Lundquist started his career with the Goodyear Tire & Rubber Co., Akron, and joined A. Schulman, Inc., in 1925 where he served for 16 years with the exception of two years' service during the war when he was with the Office of the Rubber Director in Washington.

German Materials Available

A few months ago a memorandum was distributed to rubber manufacturers stating that amounts of various synthetic materials made in the German plants could be obtained free of charge by ordering desired quantities from the Research and Development Section of the Office of Rubber Reserve, Reconstruction Finance Corp., Washington 25, D. C. Reports describing investigations of the German synthetic industry containing complete description of these materials have been issued. However, considerable quantities of Buna SS, Buna S, Buna SR and Buna S3, and the carbon blacks CK_4 and P-1250 are still on hand and amounts up to several hundred pounds may still be obtained for evaluation purposes. Requests for experimental quantities of the following compounding ingredients will be filled as soon as possible, orders to be prorated to date of receipt of request should the material run out: Koresin, Kautschol, Imbutol ZD or Naftolen ZD, Imbutol NV or Naftolen NV, Plasticator 32 or Buna 32, Vulcacit AZ, Tonerdegel.

Neoprene Used in Drill Chuck

A new type of heavy-duty drill chuck, in which a tough web of neoprene keeps the jaws in better alignment and permits one chuck to take a wider range of drill sizes, has been developed by the Jacobs Manufacturing Co., Hartford, Conn. In its function, the resilient material replaces the flexible spring steel collet shank of the traditional single-purpose type of drill chuck. The rubber is bonded to the steel jaws and passes through anchoring holes in them, a design which makes the collet or inner socket of the chuck a compact, conical unit. The "Rubber-Flex Collet," as it is called, is tightened by a screw mechanism which forces it forward into the smooth funnel-shaped nose of the chuck. As soon as the chuck is loosened for changing drills, the neoprene web pushes the jaws apart and releases the drill shank.

Plan Chicago Production Show

"Production for Profit" will be the theme of the Chicago Production Show to be staged at the Stevens Hotel in Chicago on March 20, 21 and 22, by the Chicago Technical Societies Council. The Council represents 46 scientific, engineering and technological societies with a combined membership of more than 17,000, including the Chicago Rubber Group. Wartime advances in production tools, materials, handling devices, control instruments, and factory equipment in general will be shown at the exposition. Further information can be secured from Paul A. Jenkins, Executive Secretary, Chicago Technical Societies Council, 53 West Jackson Boulevard, Chicago 4, Ill.

NEWS IN BRIEF

Sun Rubber Co., Barberton, Ohio, has introduced a new type rubber finger pad which has a full-grooved inside surface, allows air to circulate throughout, and yet holds snugly to the finger. Other features include 100% grip working surface and shorter envelope to permit complete freedom of finger action.

Resistoflex Corp., Belleville, N. J., has acquired the American manufacturing rights for an automatic vulcanizing machine formerly produced by Stenor, Inc., and sold under the trade name of Stenorizer. Renamed the Resistoflex Vulmaster, the machine will be packaged with all necessary tools and patches and sold as a unit for hot or cold-patching of tires, tubes, and other rubber products.

A new truck tire demounting unit that can separate the most tightly fitting tires from its rims with a force as great as 25,000 pounds, and yet is so easily operated that it can be handled by a girl, has been developed by Firestone. Adjustable to truck tire rims 15 to 24 inches in diameter, the tool consists of a base on which the mounted tire is laid, and an eight-legged cast iron "spider" which beneath a three-armed jack hangs from a central screw shaft above.

A new line of spark plugs, manufactured and distributed under its own brand name, has been announced by Goodrich. The line includes eleven types of plugs for commercial use.

The "Safety Flag" of the Liberty Mutual Insurance Co. was recently awarded to the Wyandotte, Mich., plant of Sharples Chemicals, Inc., for its outstanding record in accident prevention. Only twenty companies have qualified to receive this award to date.

A gripping pad for handles, consisting of a yieldable pad of sponge rubber built on a suitable base, which fits under the handle of sample cases, suitcases, or overnight bags, and is fastened across by means of a slide fastener vulcanized into the base, is covered by U. S. Pat. 2,274,605. Further information concerning the pad can be secured from the patent owner, Roy Hoffmeister, 344 Windsor Ave., Haddonfield, N. J.

The M. S. A. Chemox Oxygen Breathing Apparatus, which is termed "a radically new development in respiratory protection," has been introduced by the Mine Safety Appliances Co., Pittsburgh, Penna. The apparatus, employing a replaceable chemical canister, generates its own oxygen and gives the wearer one hour's protection in unbreathable air.

U. S. Rubber has announced that it has resumed the production of rubber battery separators for automobile, civilian aircraft and industrial storage for the first time since Pearl Harbor and that the present output of 150,000 a day will be increased as more rubber and manpower become available.

A cigarette lighter wick which is said practically never to require trimming or replacement has been developed by U. S. Rubber. The wick is made of asbestos yarn tightly braided to prevent fraying and "blossoming" and has a small core of glass yarn that provides improved capillary action for proper feeding of fluid.

Foster D. Snell, Inc., 305 Washington St., Brooklyn 1, N. Y., has issued a new bulletin entitled "Engineering Services," which outlines the specific services offered by the firm.

U. S. Rubber has resumed production of electrical wire insulated with natural rubber latex after a wartime blackout of three and one-half years.

Philip Carey Manufacturing Co. has announced a $5,000,000 plant modernization and expansion program which will affect the factories located at Lockland and Middletown, Ohio, Perth Amboy, N. J., Plymouth Meeting, Penna., and Lennoxville, Quebec. The research laboratory at Lockland will be doubled in size.

Goodrich has announced the availability of a new carbon dioxide hand fire extinguisher which holds four pounds of carbon dioxide and comes with a carrying handle and control button designed for fast operation. It can be easily carried in one hand, with the thumb of the carrying hand operating the push button.

The largest installation of rubber-lined tanks and pipes in the world is used in the production of the atomic bomb at Pasco, Washington, according to U. S. Rubber. More than 250 tons of rubber were used to line equipment for distilling and storing millions of gallons of water required in the process of harnessing nuclear energy.

U. S. Stoneware Co., Akron, has announced the acquisition of the plant, processes, equipment and personnel of the Plastispray Corp., Hollywood, Calif. Operations will be continued under the name of the Western Process Equipment Co., which will also handle the sale of Tygon materials on the Coast.

DuPont has formally waived its claim to the use of the word "nylon" as a specific trade name, and it will hereafter be used as a generic term to designate a whole family of chemically-related products which come within the definition of "any long-chain synthetic polymeric amide which has recurring amide groups as an integral part of the main polymer chain."

An investigation of scientific methods of high-frequency heating will be undertaken at a new laboratory established by the Westinghouse Electric Corp., at 420 S. San Pedro St., Los Angeles, Calif. The work will be under the direction of Dr. Russell A. Nielson.

Industrial solid tires of neoprene, which are said to reduce power-consumption up to 60% in comparison with solid tires of present construction, are scheduled for immediate production by U. S. Rubber. The tires have been designed primarily for use on electric and gasoline-powered trucks and manually-operated material handling equipment, where minimum rolling resistance is a prime necessity.

"Skylac," a new aircraft lacquer that is said to assure greatly improved safety in airplane operation by reducing fire hazards in lacquered surfaces, has been announced by Monsanto.

Work has been started on Goodyear's new 11½-acre vinyl plastic plant at Niagara Falls, N. Y., which will have a production capacity of approximately 3,000,000 pounds per year to start and will employ some 50 workers.

A line of "Keds" with non-marking soles, comprising 19 shoes made in five distinctive styles that will fit all age groups from three years upward, is currently being shown to dealers by U. S. Rubber.

Plastile, a new plastic floor tile made in nine marbleized patterns and six solid colors, has been introduced by the U. S. Stoneware Co. Tests are reported to indicate that the new tile has high resistance to wear, is unaffected by acids and alkalies, and is extremely pliable and resilient.

Self-sealing synthetic rubber gasoline tanks used so successfully in the war have a peacetime counterpart that is going into the wings of many four-motored war planes being converted into civilian passenger craft and is part of the design of most new ones, according to Goodrich.

Teleprene is the name which has been given to a new line of neoprene-jacketed drop wires being made by the Whitney Blake Co., New Haven, Conn. Drop wire must be light and flexible, installed under many unpredictable conditions and yet capable of standing up under more abuse than the cable.

Introduce New Vinyl Stabilizer

Stabilizer V-1-N, developed to prevent the discoloration and chemical breakdown of vinyl chloride and vinyl chloride-acetate copolymers when they are processed at high temperatures and exposed to light, has been introduced by the Advance Solvents & Chemical Corp., 245 Fifth Ave., New York 16, N. Y. Being a fluid liquid, Stabilizer V-1-N is said to be readily incorporated in the vinyl resin when it is worked on a mill or in a Banbury. It can be used in lacquers and other solutions based on vinyl resins. The stabilizer permits the working of vinyl resins at high temperatures such as in the mills and calenders without decomposition of the resin and gives clear transparent films. The transparency of the film will depend on the thickness of film and concentration of V-1-N. For films .005 the company suggests 2 to 3 per cent of Stabilizer V-1-N on the resin. The viscosity of Stabilizer V-1-N is less than A (Gardner-Holt), while the specific gravity is 1.03. It weighs 8.58 pounds per gallon. The color is very pale straw and it is ketone in odor.

Lockwood Addresses Shoe Finders

Warren S. Lockwood, executive vice-president of the Rubber Manufacturers Association, discussed the postwar future of the rubber heel and sole industry before a meeting of the Metropolitan Leather and Shoe Finders Association in New York City on January 11. Citing statistics, he pointed out that in the year 1944 alone the industry provided 77,000,000 pairs of soles, including taps, and 104,000,000 pairs of heels to the Armed Forces, at the same time producing 279,000,000 pairs of heels and 107,000,000 pairs of soles to meet essential civilian needs. Discussing synthetic rubber, he revealed that the technical committee of the heel and sole industry was currently working with Rubber Reserve to produce special polymers particularly suitable to the manufacture of rubber heels and soles and told the finders they need never worry about the quality of synthetic rubber products.

Data on Acetylene Chemistry

A technical report on advances in acetylene chemistry, based on a captured German report, has been made available by the Office of the Publications Board, Department of Commerce, Washington, D. C. The full title of the report is "Advances in Acetylene Chemistry at the Ludwigshafen on Rhine Works of the I. G. Farbenindustrie Co." The report was originally an address given by Dr. Rappe of the Farben company on the occasion of the first meeting of the Technical Society in Harnack House, Berlin-Dahlem, on July 26, 1940. Copies can be secured by addressing requests to the Office of the Publications Board.

Bittle Succeeds Carter

W. E. Bittle

Willard E. Bittle, factory manager of the Woonsocket, R. I., plant of the U. S. Rubber Co., has been appointed factory manager of the company's large footwear plant at Naugatuck, Conn., succeeding Harry L. Carter. Mr. Carter, who is now on special assignment for the company, rounded out 52 years of service with the Naugatuck footwear plant last month. Mr. Bittle has been with U. S. Rubber for over 18 years. Soon after being graduated from college in 1927, he started in the production control department of the Williamsport, Penna., plant, later becoming an assistant foreman and industrial engineer. In 1929 he was transferred to the Naugatuck footwear plant where in 1936 he became assistant superintendent, a position he held until 1941 when he helped reopen and modernize the Woonsocket plant for the production of war essentials.

Ordnance Plant Ruled Surplus

The Army's $53,000,000 ordnance plant at Des Moines, Iowa, operated during the war by the U. S. Rubber Co., has been turned over officially to the Reconstruction Finance Corporation as surplus property. The largest War Department plant so far taken over by the RFC, it was transferred under a new procedure developed by Army Ordnance officers in cooperation with the RFC and U. S. Rubber Co.

Taylor Timers Again Available

The "Fulscope" process time controllers for temperature and pressure are available once more on the market, according to the Taylor Instrument Companies, Rochester 1, New York. This all-electric timing mechanism brings a batch process up to a set point, times it, and then automatically terminates the process.

Textile "Team" Reports

The reports of the textile "team" sent to Germany by the Office of the Quartermaster General were recently announced by the War Department at a special research meeting held in New York City under the sponsorship of the Office of the Quartermaster General and the Inter-Society Council for Textile Research. Six reports, in the form of papers, were presented, as follows: (1) Organization and Research in Germany; (2) The Zellwolle Lehrspinnerei at Denkendorf; (3) German Methods for Utilizing Unretted Flax and Hemp as a Textile Fiber; (4) An Investigation of the Textile Dyeing and Printing Industry in Germany; (5) Woolen and Worsted Industries in Germany; (6) German Manufacture of Continuous and Staple Fibres and Related Products. Copies of these papers and of the final reports can be secured from the Office of Publications Board, Department of Commerce, Washington, D. C.

Plastolein X-55 Plasticizer

Included among a number of special plasticizers developed by Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio, for the rubber and plastics industries, is Plastolein X-55 (diethylene glycol dipelargonate). This material is compatible with nitrocellulose, most of the vinyls, ethyl cellulose, methyl methacrylate, and cellulose acetate-butyrate. It is soluble in most common solvents and is recommended by the company as a general plasticizer, particularly for good low-temperature plasticity and where flexibility is to be retained over a wide range of temperatures, without tackiness developing. The company has also developed plasticizers for specific uses in Buna N and Butyl rubber, some of these being available in laboratory amounts.

Article On Carbon Black

A comprehensive review of recent developments in the carbon black industry, under the title of "Carbon Black in War and Peace," by Leonard H. Cohan, of the Witco Chemical Co., appears in the November 25, 1945, issue of *Chemical and Engineering News*. Topics covered include carbon black requirements of synthetic rubber, new plant construction, types of black, nature of carbon black and its role in rubber reinforcement, surface chemistry of the carbon particles, and postwar prospects.

Leading Imports Analyzed

The Foreign Commerce Department of the Chamber of Commerce of the United States, Washington 6, D. C., has issued a fact analysis of various imports under the title of "Our 100 Leading Imports." Data in the report, which covers natural rubber among the other products, include the effect of World War II upon the pre-war channels of trade.

Sun Oil Announces Appointments

Sun Oil Company of Philadelphia, Penna., has announced the appointment of Frank R. Markley as general sales manager of the company. Mr. Markley, formerly manager of the company's industrial products department, will serve as assistant to Samuel B. Eckert, vice-president in charge of marketing. Ray H. Anders, assistant manager of the industrial products department since 1944, has been named to succeed Mr. Markley as manager of that department. Also announced was the appointment of Maximilian H. Leister as general manager of the motor products department. Mr. Leister has been acting general sales manager since 1942 and will now supervise the sale of all motor products, the operation of service stations, and all advertising.

Atlantic Research to Move

Several recent real estate transfers in Newton, Mass., indicate that Atlantic Research Associates, Inc., and their affiliate, National Atlantic Research Corp., may shortly move their laboratories and pilot plant operations. Final announcement of the move will be made within the next month, according to F. C. Atwood, president of both companies. Mr. Atwood also disclosed the purchase by Atlantic Research Associates of the entire interest which National Fireworks, Inc., held in the National Atlantic Research Corp.

Issue Development Supplement

The 1944 supplement to the Senate Subcommittee monograph "Wartime Technological Developments" has been issued by the Department of Labor, Washington 25, D. C. Developments reported by various trade and technical journals during 1944 are included in the supplement which, like the original, is divided into various subjects, including rubber and rubber-like materials.

Expanding Output of Gilsonite

The American Gilsonite Company has been organized by the Standard Oil Co. of California and the Barber Asphalt Corp. to broaden exploitation of the world's only known important source of gilsonite. The gilsonite fields are in eastern Utah and western Colorado and have heretofore been owned by the Barber company, but they will now be owned and operated by the new organization.

Seeks U. S. Representation

Jose A. Caffaro, Cerrito 18, Buenos Aires, Argentina, is seeking exclusive American representation in Argentina for the sale or distribution of rubber and kindred products, as well as plastics and waterproof articles. Mr. Caffaro handles sales of items for the drug sundries and toy and novelty fields and can submit both bank and business references.

Develop Miniature Oil Field

An electrically-operated miniature oil field, which is expected to benefit the synthetic rubber and other industries by saving immense quantities of oil that

otherwise would be lost beneath the earth's surface, was recently announced by the Gulf Oil Corporation. By an ingenious process, the miniature field foretells with considerable accuracy what will happen in an oil producing area for periods up to 200 years in the future. From such forecasts oil production may be planned so as to force to the surface a greater percentage of the oil reserves hidden in the earth than was previously practical. Maximum oil extraction is achieved by the ability of the apparatus to gauge exactly how water flooding or gas injection operations may be conducted without "blocking off" from the wells part of the oil reserve, so that it does not flow to the surface.

Celanese Acquires New Plant

Acquisition of the plant at Belvidere, N. J., operated during the war by the New Jersey Powder Co. for the government for the manufacture of smokeless powder, has been announced by the Celanese Corporation of America. The plant will be utilized for the production of chemicals, plastics and related materials and will eventually employ approximately 750 people. Among products made will be "Forticel," the company's latest plastic material.

E. H. Jacobs Manufacturing Co., which operates factories at Danielson, Conn., Charlotte, N. C., and Montreal, Canada, recently reopened its rubber plant at Danielson, with its former manager, J. E. Moe, in charge. The rubber plant specializes in rubberized canvas products.

A hot-poured rubber-asphalt compound for sealing joints in concrete paving and construction has been developed and introduced by the Philip Carey Mfg. Co., Lockland, Cincinnati, Ohio. The new material will be sold under the name of Careylastic.

Firestone Introduces New Tire

Engineered and designed especially for the lighter and more economical cars which several automobile manufacturers plan to produce within a short time, the Firestone Tire & Rubber Co. has announced a new 5.50x15 size tire. The new tire has a wider and flatter tread design which will give a greater area of road contact and resultant longer mileage, according to Firestone engineers. It is already in production at all of the company's domestic plants and will be made on a world-wide basis.

Chemical Exposition Date Changed

The date of the National Chemical Exposition, sponsored by the Chicago Section of the American Chemical Society, has been changed to September 10-14, 1946, and will be held at the Chicago Coliseum. Marcus W. Hinson, who has managed these expositions since their inception in 1940, will again be Exposition Manager. The Exposition will demonstrate how wartime developments are going to affect post-war products and production.

Reorganize Soviet Agencies

The creation of a new People's Commissariat of Industrial Crops in the Soviet Union, for control of the production of rubber-bearing plants, cotton, hemp, silk, cork, etc., was announced by the Soviet press early in November. Marketing and distribution of these products, however, continue to be administered by special commissariats (departments). The functions of the new department were formerly exercised by the Commissariat of Agriculture of the Soviet Union, which in December, 1939, was subjected to a major reorganization.

Union Asbestos Stock Offered

On January 7 the firm of Kuhn, Loeb & Co., New York City, offered 217,384 shares of common stock of $5.00 par value of the Union Asbestos & Rubber Co., Chicago, at $17.50 per share. Although primarily an asbestos concern, Union Asbestos also maintains an active rubber manufacturing department.

Ideal Latex Moves Plant

Ideal Latex Corp., manufacturers of latex coatings and linings and latex specialties, who were formerly located at 741 Main St., Stamford, Conn., have moved their plant and offices to 184-02 Jamaica Ave., Jamaica, Long Island, N. Y.

The Port Neches, Texas, copolymer plant, operated by Goodrich for the government, was recently given the award of honor for distinguished service to safety by the National Safety Council. The award was made because the plant was operated 1,273,077 man hours between April 1 and December 1, 1944, without a disabling injury.

Houwink Visiting United States

Dr. R. Houwink, director general of the Netherlands Rubber Institute T.N.O., Delft, Holland, formerly the Rubber Stichting, is currently visiting the United States to exchange ideas with American technologists and to investigate the synthetic rubber manufacturing plants. At a luncheon reception tendered to him at the New Weston Hotel in New York City on January 18 by the Rubber Manufacturers Association, at which Warren Lockwood, executive vice-president of the Association acted as host, Dr. Houwink delivered a short address on the properties and characteristics of natural rubber and briefly described the molecular structure which gives such rubber its inherent capabilities. He stated that natural rubber interests did not regard synthetic rubber as a threat to production and predicted that blends of both raw materials will represent the compounds of tomorrow.

Offer O'Sullivan Rubber Shares

Six thousand shares of 5% cumulative preferred stock and 30,000 shares of common stock of the O'Sullivan Rubber Corporation were recently offered by the financial house of C. F. Cassell & Co., Charlottesville and Lynchburg, Virginia. O'Sullivan Rubber Corp. is a Virginia corporation organized in September, 1945, for the purpose of acquiring all of the assets of the O'Sullivan Rubber Co., Inc., which was a Delaware corporation. The preferred stock offered had a par value of $100 per share while the common stock was offered without par value. Units of one share of preferred and five shares of common were offered at $128.50 per unit, plus preferred dividends from January 1, 1946. Some shares of common stock were offered at $6.00 per share.

Approve Dayton Stock Split

Approval of a proposal to increase the authorized number of common shares of the Dayton Rubber Manufacturing Co., Dayton, Ohio., and to split the outstanding common stock two for one was voted by stockholders of the company on January 3. The par value of the common stock will be reduced from $1.00 to 50c per share to permit the company's books to show the same declared value. The split-up is effective for stock of record on January 4, 1946.

Introduce Perbunan Latex

Two types of Perbunan Latex have been developed and introduced by Stanco Distributors, Inc., 26 Broadway, New York 4, N. Y. Type G (51% total solids) is designed especially for those services where low water absorption is an important consideration. Type H (55% total solids) is designed for applications where higher concentrations and greater stability are the important considerations.

World's Largest Dynamometer

Some idea of the massive size of the Dynamometer used by the Air Technical Service Command at Wright Field, Ohio, to check the strength and operating char-

acteristics of new airplane landing, wheel, brake and tire assemblies, can be realized from the accompanying illustration, shown with Michael R. Riola, aeronautical engineer of the ATSC, examining a tire after a test run. The three-quarter ton tire stops the 158-ton steel inertia wheel in 20 seconds. The 110-inch tire is slammed against the steel wheel as it speeds around at 2 miles a minute, simulating actual landing conditions without risking personnel or equipment. The apparatus, designed and built by the Adamson-United Co. in conjunction with the Air Technical Service Command, is equipped with controls and motors built by the Westinghouse Electric Corp. The entire unit weighs 250 tons.

Seeks Agency in Italy

The Societa Industriale Commerciale Articoli Tecnici, Corso Porta Nuova, 6, Milan, Italy, is interested in contacting American manufacturers of various types of rubber products, particularly rubber belting and rubberized cotton strips for insulation purposes, with a view to representing them in Italy. Catalogs and illustrated pamphlets are requested. The firm services the entire Italian territory, and has branches in all the principal cities.

Improved Simulated Leather

Terekan 12, a newly improved simulated leather which strongly resembles genuine leather in many respects, including workability, eye appeal, and flexibility, has been introduced by the Athol Manufacturing Co., Athol, Mass. The new product, which utilizes a synthetic latex saturant, was developed for the purpose of relieving the present bottleneck in cotton base sheetings.

New Use for Plastic Latex

Plastic latex made with Geon polyvinyl resins is now adaptable for the impregnation or plain coating of thread, yarn, string and wire, it is announced by the B. F. Goodrich Chemical Co., Cleveland, Ohio. Cords and threads of fiberglass, nylon, silk, cotton, wool and rayon, as well as wire, have been successfully coated. A technique for stranded materials somewhat similar to that used with plastic latex in ordinary fabric coating is employed. Textile fibers coated with Geon plastic latex are grease, moisture and abrasion resistant, and are permeable when used in woven fabrics. Among first products on which the new process may be used are screening, woven upholstery fabrics, tarpaulins, fish lines and thin-walled insulation.

French Rubber Position

The severe shortage of rubber in France has affected that country's economy in many ways, according to reports reaching the U. S. Bureau of Foreign & Domestic Commerce. Much of the food scarcity has been attributed to the lack of transport lorry tires, although it has been estimated that the 220,000 lorries for civilian use get 75% more use from their tires than the average in normal times. Monthly production of 350,000 bicycle inner tubes and tires must supply 18,000,000 bicycles. In a country where a large proportion of the population use bicycles for essential business, and civilian transport has largely broken down because of the lack of tires, this limited production is said to be quite serious.

Pressure-Sensitive Tapes

An interesting article on six non-oxidizing resins specially suited for use in making pressure-sensitive adhesives appears in the latest issue of the *Hercules Chemist*, house organ of the Hercules Powder Co., Wilmington 99, Delaware. The six resins discussed are all products featured by the company, each of which is characterized to a marked degree by nine properties particularly useful in the production of good pressure-sensitive adhesives, including compatability with most film-formers and waxes, tack-imparting properties, good color, low acid number, and good solubility in a wide variety of solvents.

National Plastics Exposition

The Society of the Plastics Industry has announced that the first National Plastics Exposition will be held at the Grand Central Palace, 480 Lexington Ave., New York 17, N. Y., from April 22 to 27. While the exposition is designed primarily as a trade show displaying new products, materials, equipment and methods to members of the industry, plans are being made to invite the general public on certain days. The annual meeting of the New York section of the Society will be scheduled to coincide with the dates of the exposition.

OBITUARIES

Elmer F. Brunner

Elmer F. Brunner, known nationally for his work in developing farm tires for the Goodyear Tire & Rubber Co. with which company he was associated since 1913, died at the Cleveland (Ohio) Clinic on January 5 at the age of 56 following an illness of several months. Born on February 5, 1890, in Salem, Ohio, Mr. Brunner was graduated from the Canton, Ohio, Technical School and received his degree in mechanical engineering from Carnegie Tech in 1913, joining Goodyear the same year. He was active in rim developments from 1915 to 1924 and in 1925 became sub-division head in the tire development division. He served in the latter capacity until 1935 when he was named head of the farm tire development department, a position he held until his death. During the war emergency, Mr. Brunner devoted approximately half of his time in serving as a consultant for various governmental agencies in Washington, including the Office of the Rubber Director. He was a member of the Knight Templars and the Shrine. A widow and five daughters survive.

Edward S. Underhill

Edward S. Underhill, a director of industrial relations for the U. S. Rubber Co. and associated with that company since 1918, died after a three weeks' illness at his home in Brooklyn, N. Y., on September 7, at the age of 64. Born in Brooklyn, Mr. Underhill was educated at Taylor University, Upland, Indiana. Prior to joining U. S. Rubber in 1918 in charge of press relations, he served as a political writer for various newspapers, including the old *New York World*, covering the campaign trips of Theodore Roosevelt and Woodrow Wilson when they were candidates for the presidency. Later he became confidential assistant to the Attorney General at Washington and during World War I he served in a capacity similar to the present chief of the Federal Bureau of Investigation. In the latter capacity, he was responsible for the seizure of the papers of Wolff von Gel, head of the German secret service in this country. A widow and son survive.

Mrs. F. A. Seiberling

Mrs. Gertrude Penfield Seiberling, wife of Frank A. Seiberling, chairman of the board of the Seiberling Rubber Co. and one of the pioneers of the domestic rubber manufacturing industry, died at her home in Akron on January 8 at the age of 80. Mrs. Seiberling was known nationally as a patron of music and was active in the National Federation of Music Clubs.

Frank M. McGeary

Frank M. McGeary, associated with the U. S. Navy for the past 35 years, most recently as head engineer on materials in the Research and Standards Branch, died on December 18. Mr. McGeary began his career in the Navy as assistant inspector of engineering materials at Munhall, Penna., in January, 1910. After World War I he became affiliated with the Supply Division and later with the Specifications Section of the Design Division of the Bureau of Engineering. In recent years he was responsible for the development of the symbol system for designating packings and lubricating oils which is now employed by all branches of the government and he assisted in the development of the work-factor method of purchase of lubricating oils under Navy contract.

Louis C. Jones

Dr. Louis Cleveland Jones, internationally known industrial chemist, who recently retired as director of the Stamford (Conn.) Laboratories of the American Cyanamid Co. died at his home in Greenwich, Conn., on December 29 at the age of 75. Born in Oak Hill, N. Y., Dr. Jones attended Yale University, receiving his A.B. in 1896 and his Ph.D. in 1899. During his lifetime he was associated with many chemical concerns, including the Solvay Process Co., Chemical Engineering Corp., Tar and Petroleum Process Co., and China Chemical Industries. He held many patents in alkali manufacture, nitrogen fixation and other chemical processes, and was prolific as an author on such subjects. At the time of his death he was affiliated with American Cyanamid in a consulting capacity.

Earl L. Mefford

Earl L. Mefford, manager of the Western Division of the Goodyear Tire & Rubber Co., with headquarters in Los Angeles, Calif., died after a long illness on December 30 in the Nassau Hospital, Long Island City, N. Y. He was 58 years of age. With the company for 28 years, Mr. Mefford had been manager of its Toledo, Columbus and Cleveland, Ohio, districts, as well as New York. In 1943 he was named assistant to the vice-president in Washington, D. C., and the following year was assigned as manager of the Western Sales Division in Los Angeles. A widower, he is survived by two daughters.

George C. Siebert

George C. Siebert, manager of the rubber division of the Phoenix Manufacturing Co., Joliet, Ill., for the past 18 years, died at his home in Joliet on December 11 from a heart attack. He was 68 years of age. Mr. Siebert was born in Chicago and lived there until 1927. Prior to 1927 he served as president and general manager of the Powers Rubber Horseshoe Co. and the Harlem Rubber Co. both located in Chicago. He sold his Chicago plant to the Phoenix Manufacturing Co. in 1927 and went to Joliet to become manager of its rubber division. Mr. Siebert was active in Rotary, Elk and Mason circles. A widow survives.

Lester G. Budlong

Lester G. Budlong, who was in charge of patent work for the U. S. Rubber Co. died at his home in Mt. Vernon, N. Y., on January 6, after a long illness. He was 52 years of age. Born in Clarksville, Iowa, Mr. Budlong was graduated from the Harvard School of Engineering in 1916 and after serving in World War I he attended George Washington University where he received his degree in patent law. After serving as assistant examiner at the U. S. Patent Office and as patent attorney for Westinghouse, Mr. Budlong joined U. S. Rubber as an assistant attorney in the patent department in 1929. After 1937 he managed patent affairs as a member of the staff of Arthur, Dry and Dole, company attorneys.

John G. Kreyer

John G. Kreyer, manager of the agricultural tire sales division of the Seiberling Rubber Co., Akron, died in the Akron City Hospital on January 8 at the age of 51. He had been ill since last October. Mr. Kreyer was born in Brooklyn, N. Y., and was a veteran of World War I. Prior to joining Seiberling last June, he spent most of his 24 years in the rubber industry with the Firestone Tire & Rubber Co. He started with Firestone in the development department but began to specialize in the farm equipment field after the company organized its tractor tire department. Mr. Kreyer was a member of the Society of Automotive Engineers. A widow and two sons survive.

James M. Conway

James M. Conway, president of the Bishop Gutta-Percha Co., New York City, died of a heart attack, suffered while driving his car in the city, on January 19. He was 47 years of age. Born in New York City, Mr. Conway started to work for the Bishop Gutta-Percha Co. before World War I. He left the company to join the Army in the first world war and upon his discharge returned to the company as an assistant to Henry D. Reed, then president. Later he assumed the position of purchasing agent and took on other responsibilities until the death of Mr. Reed in April, 1943, at which time he was elected president. A sister survives.

CANADIAN NEWS

Hon. C. D. Howe, Minister of Munitions, announced on December 26th that tire rationing restrictions were to be removed as of January 1, 1946. This action followed closely on the relaxation order which was issued earlier in December.

Mr. Howe emphasized that lifting of the rationing did not mean that the present stocks are such that all demands could be met immediately. Although he did not say so, undoubtedly the action of U. S. rationing authorities in ending rationing of tires had a definite effect on the action taken in Canada.

"Production is picking up steadily and if the tire buying public will continue to cooperate during the first stages by ordering tires only when really needed, I am confident normal conditions will be rapidly restored," Mr. Howe said.

Despite removal of tire rationing, however, there is not going to be any relaxing of price controls on new or used tires, tubes or retreading services. These will remain in force under the Wartime Prices and Trade Board.

The most recent relaxation came on December 1 when all tires except passenger tires and truck tires of passenger car size were made ration free. At the same time passenger drivers in class B—insurance salesmen, wholesale commercial travelers, chain store supervisors and certain collectors—were made eligible for the new tires. They had previously only been able to buy used or retreaded tires.

The drastic curtailment in production of cars and trucks has brought the end of tire rationing just about six months ahead of when it had been expected, Montreal tire officials said in commenting on the lifting of the rationing restrictions.

Strikes in motor plants have meant that some 100,000 tires are available for those who are lucky enough to still have a car in running order. The month of June was the expected date for tires to be in sufficient supply to permit lifting of the rationing, officials stated. However, they pointed out, the present time is a good one for the easing in the tire control as cars are used less in the winter, some are laid up, and owners who have to keep going are inclined to make the old tires do in the struggle with ice and winter ruts.

Companies are laying in good supplies of tires now in expectation of the demand which is certain to follow during the year but they declared tentatively that stocks should be adequate for those owners of Montreal's 70,000 cars and over 8,000 trucks who will need new tires.

In the opinion of officials in the industry if full-scale car production does get under way shortly, there may be another shortage of tires in the summer or fall.

With the end of tire rationing on January 1 the Wartime Prices and Trade Board announced that distribution controls on tires, tubes and all synthetic rubber, except Butyl, have been removed. The Board warned, however, that price controls on tires continue and increased pressure on new and used tire price enforcement may be expected within the next few months to stem any tendency towards exorbitant prices and "under-the-counter" sales.

Dominion Rubber Co., Ltd., has announced the appointment of Paul C. Jones as vice-chairman of the board of directors of the company and C. C. Thackray as president. William A. Eden, who has been with the company since 1907, acting as president from 1920 to 1939 and recently as vice-chairman of the board, is retiring from active service but will remain on the board as a director.

Mr. Jones was president of Dominion Rubber since October, 1939, and under his presidency the company greatly expanded its existing facilities and entered into many new fields of production. As vice-chairman of the board, he will continue to be active in the large program of reconversion and peacetime expansion now under way.

Mr. Thackray, the new president, entered the service of Dominion Rubber in 1920, shortly after being demobilized from the Royal Canadian Artillery in the First World War. His long experience covers all branches and divisions of the company and he was particularly identified with the large war supplies program undertaken by the company during the Second World War.

H. L. Brown has been elected president of the Seiberling Rubber Co. of Canada, Ltd., succeeding R. J. Thomas, who resigned to become vice-president and treasurer of the Seiberling Rubber Co. at Akron, Ohio.

Mr. Brown, former vice-president in charge of production of the Canadian company, will continue as factory manager, while Mr. Thomas will continue to serve as treasurer of the Canadian company. N. K. Bennett, with the accounting department for 18 years, has been named assistant treasurer of the Canadian company.

Mr. Thomas, well known in Toronto business and banking circles, serves as treasurer of the Rubber Association of Canada.

Paul C. Jones, in his capacity of president of the Rubber Association of Canada, recently stated that political disturbances, shortages of technical staff and plantation labor, and destruction of production equipment and transportation facilities, render a resumption of large scale shipments of natural rubber from the Far East unlikely for some time. Consequently, according to Mr. Jones, there is little prospect of a substantial increase in the natural rubber available to the Canadian industry for several months at least and for the better part of 1946 it will have to depend chiefly on synthetic rubber.

The cessation of war production has, however, released some natural rubber and much equipment and labor for civilian production. Moreover, considerable plant expansions started in 1945 will be completed during 1946. If production permits, the rubber industry hopes to resume in 1946 the war-interrupted export trade, essential to it for a high level of employment and prosperity in more normal times, Mr. Jones stated.

C. C. Thackray
named President of Dominion Rubber

Gutta Percha and Rubber, Ltd., has embarked upon a postwar program of improvement in its Toronto plant and has engaged the services of Giffels & Vallet, Inc., engineers of Detroit, according to Paul W. Lehman of the engineering firm. Last year in making postwar plans, the Gutta Percha Company retained this firm of industrial engineers to survey their plant and make recommendations for improved processing.

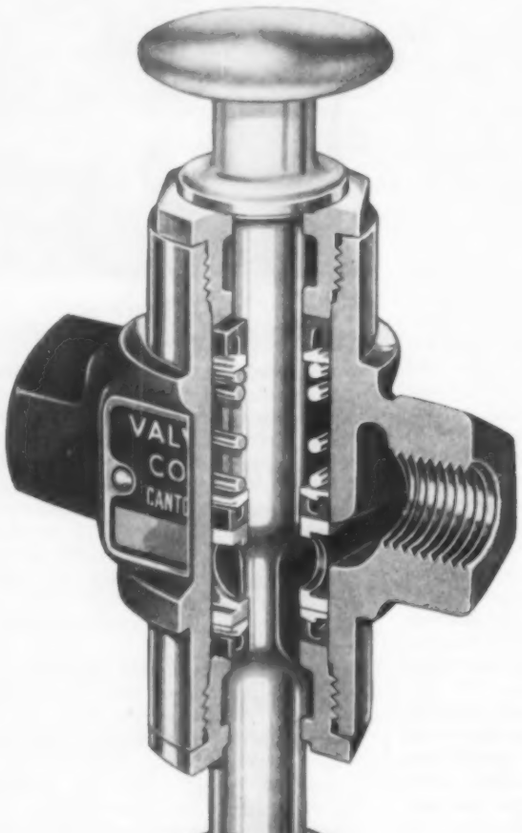
The official opening of the new $50,000 plant of the Montreal Lodi Retreading Co., Ltd., at 324 Colborn Street, recently took place with over 300 local transportation leaders present. The manner of retreading large tires was explained and demonstrated to the various groups.

Dunlop Tire and Rubber Goods Co., Ltd., declared a dividend of $1.25 per share on the common stock for the year 1945, payable December 22, 1945, to shareholders of record at the close of business on December 19, 1945.

VALVAIR

TRADE MARK

AIR CONTROL VALVES



KNOB OPERATED VALVE SHOWN

Valvair valves are new in design and principle, standard valves have been operated more than two million times without leak with air pressure exceeding 100 lbs. They are designed for indefinite life and exceptionally hard service.

They are compact—they do not have metal seals—the body is made of cast bronze and steel parts are made of stainless steel—they will not corrode.

They are made in five sizes—¼, ⅜, ½, ¾ and 1 inch—and in two-way, three-way and four-way types. They can be furnished in eight or more different designs—knob, lever, foot, cam, clevis, single diaphragm, double diaphragm or solenoid operated.

They will control air efficiently up to 200 lbs. pressure with a very light movement. The area through the valves is equivalent to pipe size with minimum pressure drop. Write for literature.

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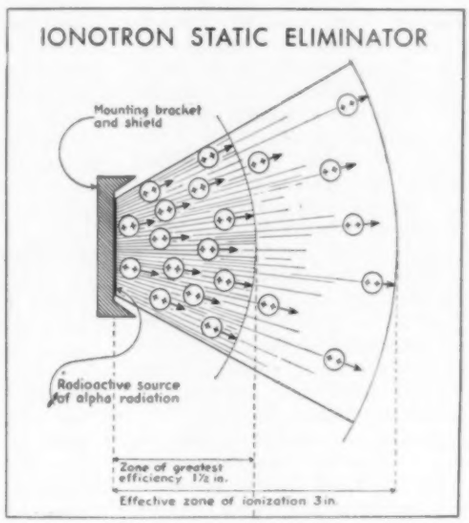
NEW EQUIPMENT

Ionotron Static Eliminator

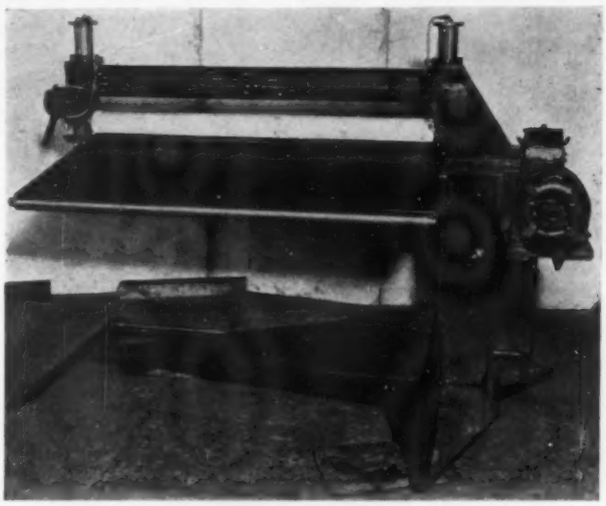
Efficient, economical elimination of static electricity from machinery and from moving paper, plastic sheeting, textiles and other materials is said to be possible with a new device, called the Ionotron Static Eliminator, developed by the United States Radium Corp., 535 Pearl St., New York 7, N. Y. The device has no moving parts and requires no electrical connections. A continuous source of alpha radiation from a radioactive surface, in the form of a long, narrow strip, ionizes the surrounding air up to a distance of three inches from the surface. Effectual removal of static electricity within this zone is permanently assured in all applications, because the radioactive strength of the active element decreases only 50 percent in some 1600 years.


IONOTRON STATIC ELIMINATOR
Mounting bracket and shield
Radioactive source of alpha radiation
Zone of greatest efficiency 1½ in.
Effective zone of ionization 3 in.

The static-neutralizing element consists of extremely thin metallic foil, incorporating a radioactive substance and welded to a nonradioactive, metallic backing. The foil serves as a mechanical bonding medium for the radioactive material and acts as a seal to prevent escape of radon gas. The construction is such that alpha radiation is emitted directionally, creating an ionized zone in the region of the electrostatic charge. The assembly is mounted in a housing designed to provide adequate shielding and can be supplied, within limits, in forms or shapes to meet special requirements. Installation of the unit requires no redesign of existing equipment but involves engineering problems—such as determination of alpha-radiation strength required and proper positioning in relation to stock and machine parts—which are best worked out in consultation with alpha-radiation specialists.

The thickness of the active layer of an Ionotron unit is 2.5 microns or less. Units are available with concentrations up to 1500 micrograms per sq. in. radium equivalent. The alpha radiation is 60 to 75% of theoretical. Total saturation ionization current produced is approximately 1.4 microamperes per milligram of radium. Emanation release is low.

UTILITY
TRUCK TYPE
BAND BUILDER
BUILT UP TO 60" WIDE



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Cable Address: UTILITY-MILWAUKEE
Long Distance Phone Call MILWAUKEE—SHERIDAN 7020

VULCANIZED VEGETABLE OILS
—RUBBER SUBSTITUTES—

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Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

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A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

• COMPOUNDS CURED AND UNCURED • PLANTATION RUBBERS • BALATA • BUNA S • ACRYLICS • ACETATE • BUTYRATE • VINYL RESINS • POLYSTYRENE • AUTO TIRES • SPLIT PARTS •

SCRAP
Rubber Synthetics Plastics

MEYER & BROWN CORP.
Founded 1894
347 Madison Ave., New York 17, N. Y.

• HARD RUBBER DUST • INNERTUBES • GUAYULE • BALATA • NEOPRENE • BUNA S • BUTYL RUBBER • ACETATE •

• WILD RUBBERS • GUAYULE • NEOPRENE • BUTYL RUBBER • VISTANEX •

FRANKLIN'S

F 77

Rubber Dressing

✓ PREVENTS OXIDATION!
✓ INCREASES DURABILITY!
✓ IMPROVES APPEARANCE!
✓ INCREASES SALEABILITY!

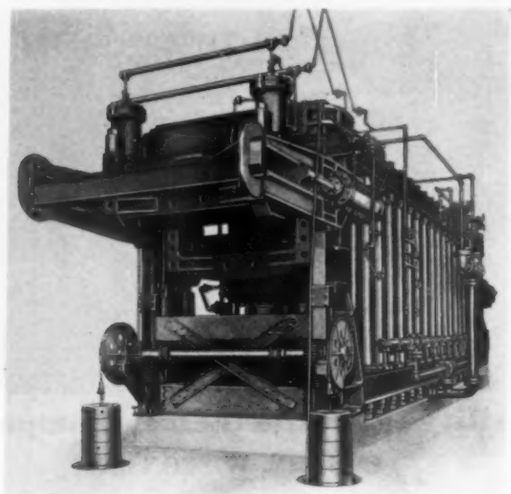
Franklin's F 77 Rubber Dressing is easy to use, and inexpensive. Contains no volatile solvents, is colorless, non-toxic, non-inflammable. Can be sprayed, wiped, or dipped.

Write for complete information

FRANKLIN RESEARCH CO.
5134 LANCASTER AVENUE • PHILADELPHIA 31, PA.
A full line of maintenance materials

Improved Belt Curing Press

An improved belt curing press which can be arranged to have two openings, or two decks, together with corresponding clamps and stretchers, permitting two lengths of belting up to 60 inches in width running in opposite directions to be cured simultaneously, has been developed by the Adamson United Co., Akron 4,



Ohio. The new press is equipped with polished platens 63 inches wide by 31 feet long, while 28 rams provide pressure during the curing operation. Proper belt tension is maintained by means of a clamp at one end and a stretcher at the other, these being mounted on separate stands rigidly braced by heavy compression members which extend the full length of the press. The clamp holds the belt while the stretcher is hydraulically pushed away from the press to give the belt the required stretch.

A distinct feature of the improved press is the means of raising and lowering the stretcher clamps to maintain exact alignment of the press platen surface with

FOR CUT AND CRACK GROWTH RESISTANCE
USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 402)

For increased tear and abrasion resistance — plus the important attribute of NON-MARKING — use Rayco Flock in compounding with crude, synthetic or reclaim.

Request working sample

RAYON PROCESSING CO. of R.I. INC.

100 TREMONT ST., CENTRAL FALLS, RHODE ISLAND

Developers and Producers of Cotton Fillers for Plastics

NEOPRENE COMPOUNDERS!

investigate **Baker's CALCINED MAGNESIA**

Baker supplies what neoprene compounders demand—Calcined Magnesia that is always uniform.

Test it in wetting power—in ease of dispersion—stability of compounded stock—rate of cure—tensile strength and plasticity.

Learn why Baker's Light Calcined Magnesia is better.

Send for free samples

J. T. BAKER CHEMICAL CO.

Phillipsburg, New Jersey

More are Coming for Your Customers

As you know, the average tire valve in service today is more than six years old. Many need reconditioning with Standard replacement parts.

Because of tremendous pent up demand however, Schrader Products sometimes are still hard to get. We're doing the best we can to fill orders.

Our advertising in national consumer and farm publications, is urging motorists to buy Schrader Caps by the set to "make tires last longer", but is also asking them to be patient if they can't get them right away.

HARD TO GET...
but more are on the way
Motorists today realize more than ever the necessity of sealing each tire valve mouth with Schrader Air-tight Caps to make tires last longer. They keep dirt out—seal the air in and help prevent under-inflation, the greatest tire enemy.
Keep your order standing with your dealer until you get as many as you need. They're important to tire life.
The sealing unit inside all standard Schrader Caps
Schrader
TIRE VALVE CAPS
Schrader
Get a set today and
MAKE YOUR TIRES LAST LONGER
A. SCHRADER'S SON • BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Inc.

Check your stock of Schrader Products and order your needs now. We'll try to make deliveries as soon as possible. In the meantime —thanks for your cooperation.

Always "recap" the tire valves

A. SCHRADER'S SON

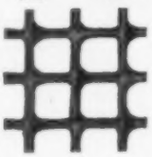
Division of Scovill Manufacturing Company, Incorporated

BROOKLYN 17, NEW YORK

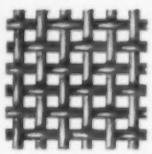
LUDLOW SAYLOR

Precision Wire Cloths

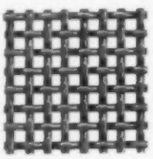
and Screens for Rubber Strainers, sifters, filters and similar process equipments.

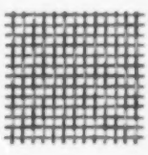


We have been specialists for many years in the making of precision wire cloths, wire screens and woven wire products.

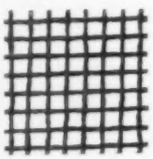


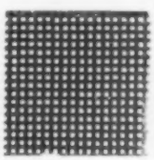
We apply our same precision principles in fabricating wire cloths into finished industrial units, for production or processing equipments or for permanent parts of countless industrial products.



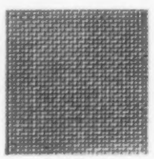


We invite your inquiries for wire cloths of all commercial metals or alloys or weaves, in continuous lengths or cut to size, or processed to meet your individual requirements.





We will follow your specifications and blue-prints exactly as your production engineers have prepared them—or we will submit suggestions for your approval.



"Perfect" alloys and metals	"Perfect" Wire Cloth weaves	"Perfect" Wire Cloth processing	"Perfect" Wire Cloth products
Super-Loy	Arch-Crimp	Bending	Baskets
Steel	Coiled	Binding	Circles
Galvanized	Double-Crimp	Brazing	Cones
Tinned	Double-Fill	Calendering	Crates
Stainless Steel	Dutch	Clinching	Cylinders
Nickel-Chromium alloys	Filter	Cutting	Discs
Aluminum	Flat-Top	Dipping	Forms
Brass	Herringbone-Twill	Dishing	Leaves
Bronze	Intermediate-Crimp	Flanging	Lengths
Commercial	Rek-Tang	Flattening	Panels
Phosphor	Selvage-Edge	Forming	Pieces
Copper	Straight-Warp	Framing	Racks
Monel Metal	Stranded	Galvanizing	Ribbons
Nickel	Sta-Tru	Painting	Rolls
Any special alloys available in rod or wire form	Triple-Warp	Shearing	Sections
	Twilled	Slitting	Segments
	Twisted-Fill	Trimming	Spacers
	Twisted-Warp	Arc-Welding	Strips
		Gas-Welding	Template shapes
		Spot-Welding	Trays

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WIRE CLOTH BASKETS — TRAYS — UNIT-HANDLING FIXTURES — all sizes, styles, shapes, weaves, clinched or welded construction.
MADE TO INDIVIDUAL REQUIREMENTS.

the adjustment clamp surfaces. This mechanical method, said to be greatly superior to hydraulic synchronization, causes the clamps and stretchers to move in perfect unison with the platen, thus eliminating entirely the possibility of the belt bending over the edges of the platen ends during the curing process. The press is also equipped with push-down cylinders which are tied in to the main hydraulic system. When the pressure in the main ram cylinders has been released the push-back rams insure even descent of middle, bottom, or both platens. It is supplied completely piped for both steam and hydraulic. The accompanying illustration is an end view of the new press.

Hornet High Frequency Unit

A small but efficient high frequency unit, for use with rubber and plastics, has been added to the line featured by W. T. LaRose & Associates, Troy, N. Y. Called the Hornet Model, it is portable, measures only 12 inches wide by 17 inches deep by 22 inches high, weighs only 80 pounds, has an output of ¾ kw, and requires only 110 volt A.C. or 220 volt D.C. for operation.

The unit can be used for pre-heating either preformed or loose compounds, and it will heat ½ pound of molding material ready for molding in one minute. The maximum size pre-form it will accommodate is 6 inches in diameter by 3 inches in thickness. A double interlock safety switch system which turns the power off automatically when the lid is raised is incorporated in the design. The tube life of the unit is approximately 1000 hours, and complete tube replacements are available.

Advantages claimed for the unit are more molded pieces per press, less mold "down time," bigger pieces molded on smaller presses, lower operating pressures on presses, and fewer molds required. A larger unit, of 2 KW output, 14 inches wide, 22 inches deep, 34 inches high, having a weight of 190 pounds and a mobility enabling it to be rolled from press to press, is also available. This unit will heat one pound of compound ready for molding in 45 seconds or less.

FOR EASY PROCESSING, USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 402)

STANDARDIZED MATERIALS HANDLING EQUIPMENT

LOAD-CARRIERS

SEND FOR LOAD-CARRIER MANUAL No. 1003MH

Standardized Load - Carriers, equipped with deep stake pockets at each corner make possible the complete conversion of the truck by the addition of standard accessories. Custom built trucks are also available in stainless steel, aluminum and Monel Metal.

MARKET FORGE COMPANY

86 GARVEY ST., EVERETT 49, MASS.

COLITE CONCENTRATE

A HIGH QUALITY CONCENTRATED LIQUID MOLD AND MANDREL LUBRICANT—*NON-TOXIC, NON-TACKY, ODORLESS.*

- *Simplifies the removal of cured rubber from the molds.*
- *Results in a transparent satin-like finish.*
- *Does not build up on the molds.*
- *Extremely concentrated and low in cost.*

A Direct Source for Zinc and other Metallic Stearates.

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PURITY · UNIFORMITY · DEPENDABILITY

Chemical Manufacturers

97 BICKFORD STREET · BOSTON, MASSACHUSETTS

In Canada: PRESCOTT & CO., REG'D., 774 ST. PAUL ST., W. MONTREAL

TENTH ANNIVERSARY

of

CAPITOL LINER PROCESS

•

Due to the scarcity of cotton piece goods, you are most likely having great difficulty in procuring materials for liner purposes.

We have materially aided some of our customers by re-running their used liners where not too much rubber deposit has accumulated.

In the present emergency it may well be our CAPITOL PROCESS on YOUR used liner may relieve your stringent problem.

WHY NOT CONSULT US AT ONCE?

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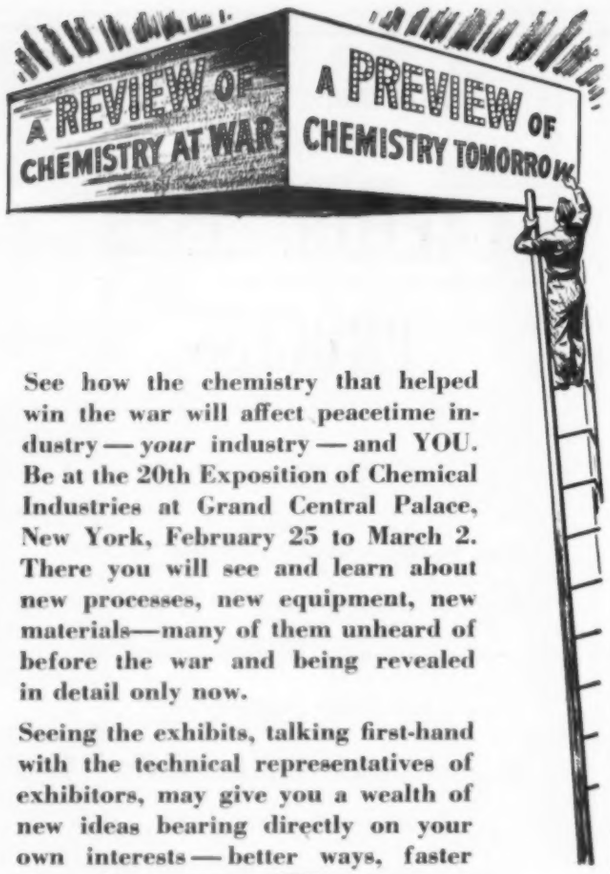
TEXTILE PROOFERS, INC.

181-193 Culver Ave., Jersey City 5, N. J.

Originators of the Capitol Liner Process



See how the chemistry that helped win the war will affect peacetime industry — *your* industry — and YOU. Be at the 20th Exposition of Chemical Industries at Grand Central Palace, New York, February 25 to March 2. There you will see and learn about new processes, new equipment, new materials—many of them unheard of before the war and being revealed in detail only now.

Seeing the exhibits, talking first-hand with the technical representatives of exhibitors, may give you a wealth of new ideas bearing directly on your own interests — better ways, faster ways, cheaper ways, NEW ways to get things done.

As a *review* of little-publicized developments during the past war years, as a *preview* of what your customers, your suppliers and your competitors may have in store for the future, this Exposition merits the attention of every chemist, engineer and industrial executive in America.

There will be something at the Exposition for everyone engaged in or associated with every important phase of industrial chemistry—with heavy emphasis on new chemical industries and their products, on ideas for the conversion of existing plants to new uses.

20TH EXPOSITION OF
CHEMICAL
INDUSTRIES
FEB. 25 – MAR. 2
GRAND CENTRAL PALACE
NEW YORK CITY

Plan to be at Grand Central Palace in New York during the week of February 25 to March 2—and be sure to bring your key associates with you!

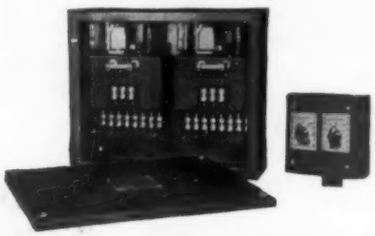
Management of International Exposition Co.

523

EQUIPMENT (CONT'D)

Photoswitch Repeat-Cycle Timer

The Photoswitch Repeat-Cycle Timer Type 2T15U, described as a rugged industrial electronic timer designed for machinery and process control, has been introduced by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass. It is recommended for applications



New Photoswitch Repeat-Cycle Timer for applications requiring two adjustable timing periods to run in a continuous cycle.

requiring two adjustable timing periods to run in a continuous cycle. This cycle is initiated by either momentary or sustained contacts, and provision for automatic recycling is provided. Each timing period is adjustable from 1/20th second to two minutes. Control is accomplished through specially designed snap-action relays which result in extreme accuracy and interchangeability. Interval variations in repeat cycle timing are less than 2%. Photoswitch Timer Type 2T15U is universal for six maximum time ranges from 1.5 seconds to two minutes for each period of the cycle. Each range is represented by a timing element which is snapped into a clip on the front of the control. The timer may be then set for any intervals up to these maximums by dials which are located either on the timer itself or in a small housing at a more convenient location.

Advances in Rubber During 1945

(Continued from page 472)

(171) R. B. Stambaugh, M. Rohner and S. D. Gehman; Speed of Retraction of Rubber; *J. App. Physics,* **15,** 740 (1944); *Rubber Chem. & Tech.,* **18,** 380 (1945).

(172) Recorded Rubber History Changed by New Document; *R. A. (N.Y.),* **57,** 458 (1945).

(173) L. P. Kyrides; Report on the Early Development of American Synthetic Rubber; *R. A. (N.Y.),* **56,** 631 (1945).

(174) Dinsmore Talks on Future Prospects in Rubber; *I.R.W.,* **111,** 576 (1945).

(175) J. L. Collyer; Raw Material Outlook in the Rubber Industry; *I.R.W.,* **111,** 559 (1945).

(176) Rubber Chemicals in Postwar; *I.R.W.,* **111,** 441 (1945).

(177) B. K. Brown; Availability of Petroleum for Synthetic Rubber Manufacture; *Chem. Eng. News* **23,** 713 (1945).

(178) Carbon Black—Current and Postwar Outlook; *Chem. Eng. News,* **23,** 1338 (1945).

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RUBBER-FLO
MOLD LUBRICANT

This is what it does:
—Gives lustre to finished parts;
—Easier removal of parts;
—Keeps molds cleaner longer;
—Economical.

RUBBER-SOL

A new easy and faster method for salvaging metal parts from rubber. Ideal for both aluminum and steel molds. Send us a sample of your salvaged parts for inspection. RUBBER-SOL has many other uses too!

Send Us Your Problems

PREVENTIVE MAINTENANCE CO.
1997 Fairfield Ave., Bridgeport 5, Conn.

RANDALL & STICKNEY

Hand Grip Rubber Gauge No. 3-B

Height .....9"	Length .....9¾"	Range .....½"
Depth of Throat ....6½"	Dial 50 Divisions Each Div. 1/1000"	Weight .... 4 lbs. Frame . Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL, Waltham, Mass.

MAGNESIA

MAGNESIUM CARBONATE
MAGNESIUM OXIDE

EXTRA LIGHT

The Original Neoprene Type.
A supreme quality product for the rubber trade. Extremely fine state of division. Improves storage stability and resistance to scorching. A curing agent unexcelled for increased modulus, greater resilience, reduced heat build-up, lower compression set and retention of tensile strength during heat service.

LIGHT

A high quality product of greater density than "Extra Light," but high in MgO and low in impurities. An excellent value for many uses.

MEDIUM

A good value. Very active. High Magnesia content, low in impurities. Medium density.

HEAVY

All types can be furnished. Specially ground to meet the exacting Code Pigment Specifications of the Rubber Trade. Unground types for chemical uses.

PACKAGES—Specially designed to protect contents from moisture and air. Corrugated carton with special water-proof liner, and inner paper liner. Five-ply multi-wall bag, including asphalt liner.

Special Service for All Requirements of the Rubber Trade

GENERAL MAGNESITE & MAGNESIA COMPANY

Specialist in Magnesia

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You may not believe it, but our web guide will keep trim or weave within 1/16", plus or minus. You probably *won't* believe that, so let us prove to you that it can be done. Write, wire, or phone for free demonstration. We'll install a guide in your plant, and leave it there for thirty days. Then *you* decide whether you want to say "Thanks!", or keep the machine. There's no charge, no obligation, for a trial installation. You can't lose!

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AUTO MATIC
WEB GUIDE

"You can't afford to be without a Stanford"

STANFORD ENGINEERING CO.
SALEM, ILLINOIS TORONTO, CANADA

REVIEWS

BOOKS

Standards on Electrical Insulating Materials (with Related Information). Published by the American Society for Testing Materials, 260 So. Broad St., Philadelphia 2, Penna. 6 x 9 in. 560 pp. $3.25.

This special compilation prepared by the American Society for Testing Materials' Committee D-9 on Electrical Insulating Materials gives in their latest form the more than seventy-five widely used specifications and test methods covering electrical insulating materials and related products. In addition to the standards developed by this committee, there are others included pertaining to certain plastics, rubber, textiles and paper products. Included also are several reports covering the significance of tests of insulating materials, a proposed method of testing askarels, and most recent recommendations affecting standards on electrical insulating materials. The reports discussing the tests cover dielectric strength, impact, tensile strength, power factor, resistivity, and for insulating liquids several others such as pour point, viscosity, etc. There are groups of standards covering insulating varnishes, paints, lacquers and their products. Specifications and methods on insulating paper, mica products, rubber products, textile materials, etc., are grouped.

•

Plastics: What Everyone Should Know. By Bernard Wolfe. Published by the Bobbs-Merrill Co., 468 Fourth Ave., New York 16, N. Y. 5½ x 8 in. 190 pp. $2.50.

Issued as one of the "What Everyone Should Know" series (similar books cover astronomy and aviation to date), this book explains plastics to the layman from the angle of what plastics are made of, what can be done with them, what is being done with them, who makes them, why they are currently hard to get, and what are their prospects for the future. There is an 18-page section devoted to synthetic rubber which briefly traces the history of rubber, the development of the synthetics, and the applications of these synthetics. To make the book more useful, it is equipped with a glossary of terms, a list of available books and periodicals, and an industry guide to firms and trade names in the field.

•

The Pan American Yearbook: 1945. Compiled and published by Pan American Associates. Available from the Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 5½ x 8½ in. 830 pp. $5.00.

Said to be the first complete, practical reference book to cover the different trade and cultural activities of all the Americas—North, Central and South—this manual is of special interest to all concerned with reconversion and new markets for their products. It is divided into three parts: Part I furnishes data on geography, government, transportation, people, economy, education and culture of the various countries; Part II consists of chapters devoted to these countries containing information on history, population, official trade controls, and similar data; Part III lists more than 25,000 firms and representatives in the Americas, classified by industry and also alphabetically within each country.

•

Flexible Metal Hose for Every Industrial Use. Chicago Metal Hose Corp., Maywood, Ill. 8¼ x 3¾ in. 10 pp.

This is a catalog of various types of flexible metal hose and tubing for reciprocating parts, vibration or manual handling, manufactured by the company for use in the conveyance of steam, oils and gases. Illustrations and descriptions of the firm's corrugated flexible metal hose, Diesel exhaust hose, oil line hose, cellu-lined hydraulic hose, stainless steel tubing, stainless steel bellows, couplings and conduits are included.

Plan NOW to Speed Up Production

New Laboratory Mills

Two Sizes
6" x 12"
6" x 16"

IF your post war plans for greater production call for special Rubber machinery, we invite you to submit them to Thropp Engineers NOW. They will gladly work with you in designing custom built mills for your particular requirements to enable you to convert quickly to peace time production. Write NOW!

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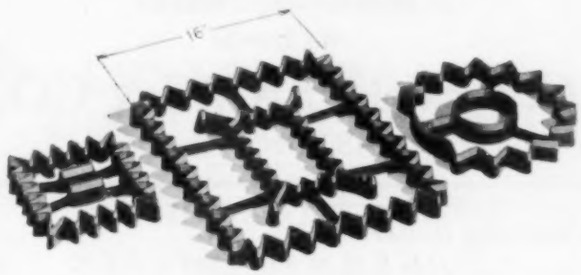

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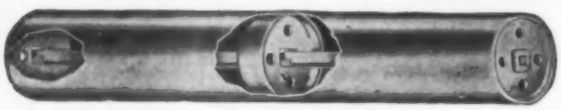

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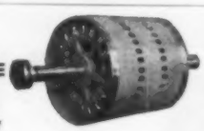

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SUBMIT TRIAL SAMPLES

BOOKLETS, CATALOGS, Etc.

Jar Rings for Use in Home Canning: Their Testing and a Proposed Specification. (Miscellaneous Publication M-181). National Bureau of Standards, Washington, D. C. 6 x 9 in. 20 pp. (Available from Superintendent of Documents, Washington 25, D. C., at 10c per copy.)

This pamphlet presents the results of a investigation of jar rings which was undertaken by the U. S. Department of Agriculture in collaboration with manufacturers and the National Bureau of Standards. Rings were analyzed for rubber content, and measurements were mode of their tensile strength, ultimate elongation, stress at 100% elongation, swelling on processing, indentation by a ring simulating a jar cap, and hardness. The results of the investigation are expressed in terms of a proposed specification for jar rings. Topics covered include: variations in jars and tops, laboratory processing, methods of measuring physical properties, chemical analysis, taste imparted to canned food by jar rings, aging, canning tests as a basis for development of a jar-ring specification, and correlation of properties and composition with results of canning tests.

•

Industrial Safety Tomorrow. National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill. 8½ x 11 in. 16 pp.

This booklet consists of a report on a program for safety in industry which was prepared for 38 sponsoring national organizations by a committee of safety directors, industrialists and educators. It is recommended by these organizations as an aid to industrial executives and safety directors, public officials and insurance and other organizations in planning effective measures to hold down the human and economic costs of industrial accidents. Among the topics covered are: safety personnel, machinery and guards, inspections, personnel selecttion and training, re-employment of service men and women, cooperating agencies, etc. The booklet is illustrated with charts giving a comparison of the number of workers killed to the number employed in 1941 and 1944, accident costs to industry, and a break-down showing the comparative number of accidental deaths and injuries in 1944 at work, in public, and at home.

•

Watertown Book of Plastics. Watertown Mfg. Co., Watertown, Conn. 8 x 10¾ in. 48 pp.

This catalog, which is illustrated with numerous excellent photographs, describes standard and custom-made products turned out by the company and discusses the various thermosetting and thermoplastic materials used in their manufacture. In addition, it contains a detailed history of the company, descriptive material on its new laboratory, and a lengthy account of its molding methods, its buffing, finishing and assembly operations, and its engineering procedures. Also included is a plastics properties chart.

•

Modern pH and Chlorine Control. W. A. Taylor & Co., 7300 York Rd., Baltimore 4, Md. 5 x 7¾ in. 88 pp.

The seventh edition of this booklet represents a complete revision of the company's combination handbook and catalog. Besides offering both simple and technical explanations of the meaning of pH control, the booklet presents specific discussions of the application of pH, chlorine and phosphate control to 35 industries, sets forth the precautions to be observed in making determinations, and provides descriptions and photographic illustrations of all of the company's outfits, including eight new sets.

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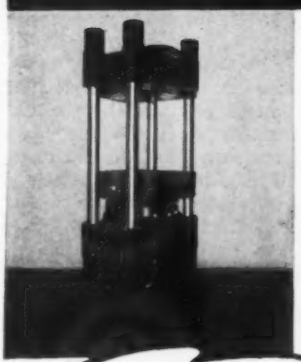

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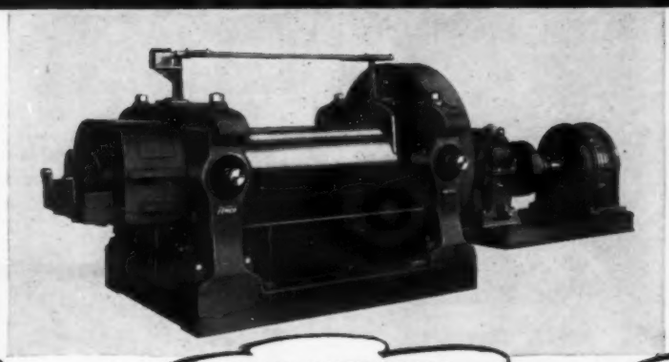
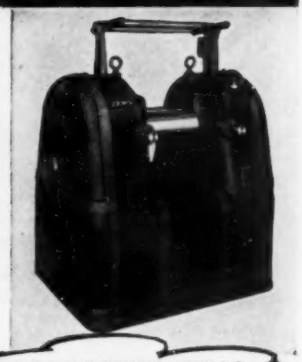


HEAVY DUTY MILLS



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PIONEERS OF THE INDUSTRY

Carbon Black Manual. Issued by the Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 6 x 9 in. 56 pp.

This is a well-compiled reference manual of the types, characteristics and uses of carbon black and a summary of current ideas on such blacks. Divided into ten chapters, it first gives a complete list of all of the Witco blacks, followed by a discussion of the physical and fundamental properties of these blacks. The following chapter is devoted to a general survey of Witco Blacks in rubber, including natural rubber, GR-S, GR-I (Butyl), and GR-M (Neoprene GN), with physical test results shown for various typical formulations. The balance of the manual is devoted to the numerous applications of the blacks, with specific chapters discussing uses in rubber, paint, ink, plastics, paper, and concrete. A final chapter describes Witco Blacks for miscellaneous uses. One valuable portion of the manual is a discussion of the connection between the fundamental structural properties and the behavior of carbon blacks in their many industrial applications. To avoid unnecessary repetition, references have been included to publications and bulletins previously released by both the Continental and Witco laboratories. No attempt, however, has been made to review and refer to the extensive literature on the subject.

•

An illustrated 4-page bulletin (No. 515) gives a concise description of the *Speedaire Fan Cooled Worm Gear Reduction Units* produced by the Cleveland Worm and Gear Co., 3293 E. 80th St., Cleveland 4, Ohio. It is claimed that because of a more effective removal of heat, the Speedaire unit delivers up to twice the horsepower capacity obtainable from standard type worm reducers of equal size.

•

Anti-scale, anti-corrosion, and anti-foam treatment of water stills and evaporators with the *K.A.T. Water Conditioner* is the subject of a 4-page folder issued by the American K.A.T. Corp., 331 Madison Ave., New York 17, N. Y.

•

The future of America's synthetic rubber industry is discussed briefly by P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., Akron, Ohio, in a 4-page folder, *Synthetic, A Great New Factor in Our Economic Life*, issued by the company.

•

A 16-page booklet on *Rotameters* (Publication R-100A), liquid flow-measurement instruments produced by the Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia 32, Penna., has been issued by the company. In addition to catalog material on the Cochrane line, data is given on the selection of rotameters for particular services.

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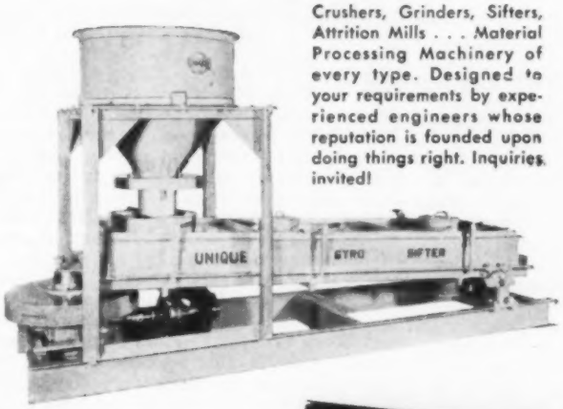

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK JAN. 17, 1946

Natural Rubber

DESPITE the continued political disturbances in the Netherlands Indies and difficulties being experienced with labor in Malaya, some shipments of natural rubber have begun to arrive in the United States from both of those important sources. As yet, shipments have not reached the quantity stage, but at least one cargo of 8,000 tons was delivered in New York early this month, with some three or four additional cargoes scheduled for delivery before the end of the month.

Under existing regulations, all of the incoming natural rubber is the property of the Office of Rubber Reserve of the Reconstruction Finance Corporation, and will eventually be allocated to rubber manufacturers in the United States and other countries, but actual allocation must await a decision on the price to be paid for the rubber. Negotiations leading to the declaration of such a price are currently being conducted between the United States and the major rubber-producing areas.

Also of interest during the past month in the natural rubber field was the issuance of a decree in Rio de Janeiro under which the Brazilian Government acquired the Ford plantations in Brazil. The plantations, reported to have cost Ford approximately $9,000,000 to date, were acquired for the token sum of $250,000, and Brazil has immediate plans to spend about $1,215,000 for further development of the plantations, known as Fordlandia and Belterra.

Prices shown below are ceilings set by the Office of Rubber Reserve, Reconstruction Finance Corporation:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X...	22½	40
Thick Pale Latex Crepe, 1X..	22½	40
Thin Pale Latex Crepe, 1X..	22½	40
Thick Brown Crepe, 1X.....	21¾	38⅞
Thin Brown Crepe, 1X.....	21¾	38⅞
Thick Remilled Blankets, #1..	21¾	38⅞
Rolled Brown or Flat Bark..	18	35½
Smoked Blankets, #1.....	21¾	38⅝
Claro Brand 1XRSS.....	22½	40
Sole Crepe Trimmings.....	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude.....	15	29
Cut Fines, Crude.....	15½	29¾
Cut Fines, Washed & Dried..	22½	40
Upriver Coarse, Crude.....	12¾	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅝	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17¾	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots..	27¼	45¼
Heat-Concentrated, Carload Drums	29½	47

C for Civilian Use; N-C for Non-Civilian Use.

Scrap Rubber

Scrap rubber dealers are faced with a two-fold problem at the moment, i.e., segregation of synthetic scrap and outlets for the purchase of such scrap. Some dealers report that reclaimers are hesitant about purchasing synthetic scrap, even when offered in the form of all-synthetic tires, with the result that inventories are beginning to assume too large proportions. The trade feels that the point will soon be reached when the reclaiming industry (and its customers) will have little choice as to the type of rubber scrap, but until this point is reached inventories will probably continue to grow. The Office of Rubber Reserve has revealed that some 182,000 tons of scrap collected in war-time operations has been found completely unsuitable for reclaiming and will be discarded as valueless. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires .....ton		$20.00
Beadless truck tires.....ton		26.00
Mixed truck tires.....ton		20.00
Beadless passenger tires.....ton		26.00
No. 1 passenger peelings.....ton		52.25
No. 1 truck peelings.....ton		52.25
No. 2 passenger tubes.....lb.		.07¾
Red passenger tubes.....lb.		.07½
Black passenger tubes.....lb.		.06¾
Mixed passenger tubes.....lb.		.06½
No. 2 truck tubes.....lb.		.07½
Red truck tubes.....lb.		.07¾
Black truck tubes.....lb.		.06½
Buffings .....ton		35.00
Bicycle tires .....ton		15.00
Air bags and water bags.....ton		15.00
Boots and shoes.....ton		33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3.....lb.	.43½ @	.44
Peeler, carded, 23/4/3.....lb.	.44½ @	.45
Peeler, carded, 15/3/3.....lb.	.41½ @	.42
Peeler, carded, 15/4/2.....lb.	.41½ @	.42
Peeler, carded, 13/3/3 .....lb.	.40½ @	.41
CHAFERS		
Carded, American, 1 1/16".....lb.	.43½ @	.44
Carded, American, 1".....lb.	.39½ @	.48

Sheetings

48x40	36	in.	5.50	.....lb.	—	@ 8.272
40x40	36	in.	6.15	.....lb.	—	@ 7.398
40x36	36	in.	6.50	.....lb.	—	@ 7.000
48x48	40	in.	2.50	.....lb.	—	@17.200
48x48	40	in.	2.85	.....lb.	—	@15.087
56x60	40	in.	3.60	.....lb.	—	@12.638
48x44	40	in.	3.75	.....lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A

Cotton

The price of middling uplands on the Cotton Exchange has swung in the very narrow range of 19 points since our last report (December 13), high for the period being 25.39 on December 27 and low 25.20 on December 17. The low price was also touched on January 8 and January 15. The average price for middling uplands for the month of December was 25.21, based on 23 trading days. The basic reason for the narrow price range was the deep uncertainty felt by the trade as to the possible effect of the pending cotton ceiling, first announced by OPA on January 14. According to the advance notice given by the government pricing agency on that day, the ceiling prices for cotton would be the then current parity price plus an allowance for transportation plus a "cushion" to allow for subsequent advances in parity between the present period and the end of the year. Under this formula, the grower's ceiling price for 15/16 middling in Zone 1 (which includes the western parts of North and South Carolina) would be 24.09 cents a pound. Considerable opposition to the proposed formula has arisen and the Cotton Bloc in Congress threatens to hold up the entire price stabilization program if it becomes regulation. Accordingly, it is taken for granted in the trade that some compromise will be effected and a new approach to cotton ceilings instituted. Quotations for middling uplands on the Exchange follow:

	Dec. 13	Jan. 17		
	Close	High	Low	Close
March	24.65	24.60	24.57	24.60
May	24.55	24.59	24.54	24.58

Reclaimed Rubber

There has been no slack in demand for reclaim since our last report and reclaimers are in agreement that the automotive labor difficulties have had not the slightest effect on such demand. As evidenced in the past several months, the demand stems from practically all branches of the industry, with tires, insulated wire and heels and soles well in the vanguard. The labor situation in the reclaiming field is gradually approaching a nominal state, with the result that most reclaimers have been able to step up production somewhat in recent weeks. The problem of proper segregation of scrap is still plagueing the field, but solutions are held to be near at hand. Prices shown below are ceilings on typical grades of reclaim:

Shoe		
Unwashed .....lb.	.07½ @	.07¾
Tube		
Black Tube .....lb.	.11¾ @	.12
Red Tube .....lb.	.12½ @	.12¾
Tires		
Black (acid process) .....lb.	.08 @	.08¼
Black, selected tires .....lb.	.07 @	.07¼
Truck, Heavy Gravity....lb.	.09 @	.09¼
Miscellaneous		
Mechanical blends .....lb.	.05 @	.06
White .....lb.	.13½ @	.13¾

Ducks

Enameling (single filling)....lb.	—	@	.44¼
Belting and Hose.....lb.	—	@	.39
Single filling, A grade.....lb.	—	@	.19¾
Double filling, A grade.....lb.	—	@	.20¾

As a MOLD LUBRICANT

—Orvus permits articles to leave molds readily; molds clean easily.
—Orvus is effective in hardest water.
—Orvus forms no insoluble materials which might be deposited as a film on mold or rubber.

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—Orvus cleans thoroughly such articles as inner tubes, automotive parts and other molded and extruded rubber goods. Leaves articles with a pleasing finish.

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ORVUS is a sulfated alcohol type cleanser—not a soap.

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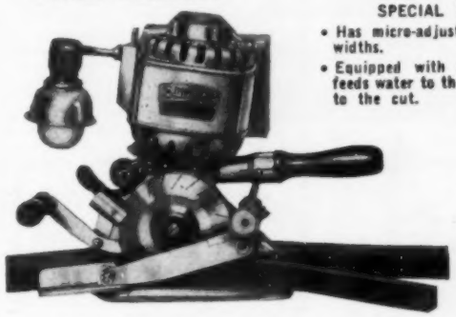
A PORTABLE machine capable of stripping slab rubber up to 1″ thick at the rate of 20,000 feet in 8 hours. Any width desired.



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- Automatic sharpener device keeps knife keen and sharp.
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Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

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CHEMICAL MARKETS

New York, Jan. 17, 1946
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28	.33
A-10	lb.	.36	.42
A-19	lb.	.52	.58
A-32	lb.	.59	.69
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Aldehyde ammonia, crystals	lb.	.65	.70
Altax	lb.	.39	.41
Beutene	lb.	.59	.64
B-J-F	lb.	.34	.39
Butasan	lb.	—	1.10
Butyl Zimate	lb.	—	1.10
Captax	lb.	.34	.36
Crylene	lb.	.40	.47
Di-Ortho-Tolyguanidine	lb.	.44	.46
Diphenylguanidine	lb.	.35	.41
El-Sixty	lb.	.36	.43
Ethasan	lb.	—	1.10
Ethyl Tuads	lb.	—	1.25
Ethyl Zimate	lb.	—	1.10
Ethylidine aniline	lb.	.42	.43
Formaldehyde aniline	lb.	.31	—
Guantal	lb.	.39	.48
Hepteen	lb.	.34	.39
Hexamethylenetetramine	lb.	.33	—
Lead Oleate, No. 999	lb.	.13	—
Witco	lb.	.15	—
Ledate	lb.	—	1.20
Methasan	lb.	—	1.20
Methyl Tuads	lb.	—	1.25
Methyl Zimate	lb.	—	1.20
Monex	lb.	—	1.25
Pentex	lb.	.74	.84
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	1.63
R & H 50-D	lb.	.42	.43
R-2 Crystals	lb.	—	1.55
Rotax	lb.	.44	.46
Safex	lb.	1.15	1.25
Santocure	lb.	.60	.67
Selenac	lb.	—	1.60
SPDX-G	lb.	.53	.58
Super-Sulfur No. 2	lb.	.13	.15
Thiocarbanilid, drums	lb.	.28	.33
Thiofide	lb.	.39	.46
Thiotax	lb.	.34	.41
Thiurad	lb.	—	1.25
Trimene	lb.	.54	.64
base	lb.	1.03	1.18
Triphenylguanidine	lb.	.45	—
Ulto	lb.	.99	1.04
Ureka	lb.	.50	.57
Blend B	lb.	.50	.57
Blend C	lb.	.48	.55
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	—
Inorganic			
Litharge, domestic	lb.	.07	.07½
Magnesia, calcined, heavy	lb.	.04	—

COLORS

Blues [b]			
Prussian	lb.	.36	—
Ultramarine	lb.	.17	.27
Browns [b]			
Mapico	lb.	.1135	—
Umber, Turkey	lb.	.04¼	—
Greens [b]			
Chrome	lb.	.23	—
Guignet's Green	lb.	.70	—
Reds			
Antimony crimson, 15/17	lb.	—	—
Indian	lb.	.08¼	—
Domestic (Maroon)	lb.	.11	—
Mapico	lb.	.096	—
Red oxide, pure	lb.	.10	.12
Rub-Er-Red	lb.	.09¼	—
Whites [b]			
Cryptone No. 19	lb.	.0560	.0585
Cryptone CB No. 21	lb.	.0560	.0585
Cryptone ZS-800	lb.	.0825	.0850
Lithopone:			
Albalith	lb.	.04¼	.04½
Astrolith	lb.	.04¼	.04½
Azolith	lb.	.04¼	.04½
Ray-cal	lb.	.05½	.05¼
Rayox	lb.	.14½	.15¼
Titanox A	lb.	.14½	.14¾
Titanox B	lb.	.05¾	.06
Titanox C	lb.	.05½	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼	.07½
Anaconda, lead free	lb.	.07¼	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼	.07½
XX Red—4	lb.	.07¼	.07½
Kadox, black label—15	lb.	.07¼	.07½
Red label—17	lb.	.07¼	.07½
72	lb.	.07¼	.07½
St. Joe, black label	lb.	.07¼	.07½
green label	lb.	.07¼	.07½
red label	lb.	.07¼	.07½
U. S. P.—7, bbls.	lb.	.10½	.10¾
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½	.09¾
Green seal—8	lb.	.09	.09¼
Red seal—9	lb.	.08½	.08¾
Yellows [b]			
Cadmolith	lb.	.55	.60
Chrome	lb.	—	.50
Mapico	lb.	.071	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS
(In bags, carload lots)

Arrow Compact	.05¼ @	—
Atlantic	.05¼ @	—
Certified	.05¼ @	—
Certified Spheron	.05¼ @	—
Continental	.05¼ @	—
Disperso	.05¼ @	—
Dixiedensed	.05¼ @	—
Dixiedensed 66	.05¼ @	—
Excello	.05¼ @	—
Furnex	.05¼ @	.06
Furnex Beads	.05½ @	.06
Gastex	.05¼ @	.06
Kosmobile	.05¼ @	—
Kosmobile 66	.05¼ @	—
Kosmos-Dixie 20	.05½ @	.06
Micronex (Amarillo)	.05¼ @	—
Micronex Beads (Amarillo)	.05¼ @	—
Pelletex	.05½ @	.06
P-33	.04 @	.06½
Philblack A	.05 @	—
Sterling	.035 @	—
Supreme	.05¼ @	—
Thermax	.0225 @	.05
Wyex	.05¼ @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	24.50
99¼%-300	ton	—	16.50
86-90%-300	ton	—	13.50
Asbestine	ton	16.50	20.00
Atomite	ton	—	27.50
Barium carbonate (98-100%)	ton	47.00	49.00
Barytes	ton	25.35	36.00
Bentonite	ton	11.00	16.00
Blanc fixe, dry	ton	60.00	@67.00
Calcene	ton	37.50	43.00
Catalpo (fact)	lb.	.02	—
Clay, Aerfloted, Suprex	ton	11.00	@23.50
Aerfloted Paragon	ton	10.00	22.50
Champion	ton	—	@11.00
Crown	ton	—	11.00
Dixie	ton	11.00	@23.50
Kaolloid	ton	—	9.00
Langford	ton	—	8.50
Magnolia	ton	—	@10.00
McNamee	ton	10.00	@22.50
Par	ton	—	@11.00
Witco	ton	10.00	—
Kalite No. 1	ton	26.00	@52.00
Kalvan	ton	100.00	@126.00
Keystone white	ton	—	14.00
Magnesium carbonate	lb.	.06¼	—
Mineralite	ton	—	30.00
Pyrax A	ton	—	@ 8.40
Rottenstone (powd. Dom.)	ton	25.50	37.50
Rubberol	lb.	—	.17½
Silene EF (calcium silicate)	lb.	.055	.06
Silical	ton	65.00	@85.00
Snowflake white	ton	—	16.00
Talc, domestic	ton	14.50	@ —
Whiting, commercial	ton	16.00	@26.00
Witco	ton	—	@ 6.50
Witcarb R	ton	—	@100.00
Witcarb R-12	ton	—	@40.00
Wood Flour (100 mesh)	ton	30.00	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	@27.00
Black Diamond	ton	25.00	—
Dielex	lb.	—	@ .06
Hard Hydrocarbon	ton	25.00	27.00
MilliMar	lb.	—	.05½

MISCELLANEOUS

Aromatics—Rodo $0	lb.	4.00	4.50
Rodo $10	lb.	5.00	5.50
Curodex 19	lb.	2.75	—
Curodex 188	lb.	3.50	—
Curodex 198	lb.	4.50	—
Para-Dors	lb.	4.50	—
Areskleno No. 375	lb.	.35	.50
Darvan (dispersing agent)	lb.	.30	.39
Santomerse S	lb.	.11	.25
Sponge Paste	lb.	—	.18
Sunproof	lb.	.22¼	.27¼
Tonox	lb.	.50	.59
Ty-Ply	gal.	6.75	@ 8.75
Unicel (blowing agent)	lb.	.50	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38	3.63
Nitric, 36 degrees	cwt.	5.00	—
Acids, Fatty			
Laurex	lb.	.14¼	.17¼
SL-20	lb.	.11	.13
Stearex Beads	lb.	.10	.11
Stearite	lb.	.10	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70	5.7[illegible]
Soda Ash, 58%	cwt.	1.15	2.98
Oils			
Degras, bbls. [a]	lb.	.10	.12
Para-Flux	gal.	.17	.18
Para-Lube	lb.	.046	.048
Petrolatum, amber	lb.	.03¼	—
Pigmentaroil, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Pine, tanks [a]	gal.	.55	—
Rosin Oil, empd.	gal.	.40	—
Rubberol	lb.	.13½	.14
Rubtack	lb.	.10	—
Seedine, c.l.	lb.	.07¼	—
Witco Palm Oil	lb.	—	—
Witco Softener No. 20	gal.	.20	—
Woburn No. 8, c.l.	lb.	.06	—
Resins and Pitches			
Pitch, Burgundy	lb.	.08	—
coal tar	ton	19.00	22.00
hardwood	ton	16.00	22.50
pine, 200 lb. gr. wt.	bbl.	—	4.50
Pigmentar, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Retort Pine Tar, drums	gal.	.26½	.27½
Solvents			
Acetone, pure [a]	lb.	.07	—
Benzene, 90%, tank car	gal.	.14	—
Beta-Trichlorethane	gal.	—	.20
Bondogen	lb.	.98	1.25
Carbon, bisulfide	lb.	.05	.08¼
Carbon tetrachloride	gal.	.73	1.27
Dichlorethylene	lb.	—	—
Dipentene, cml., drums	gal.	.48	.50
Ethylene dichloride	lb.	.07½	.08¼
Plastogen	lb.	.07¾	.12
Reogen (drums)	lb.	.11½	.15
Rub-Sol	gal.	.09½	—
Trichlorethylene	lb.	.08	.09¼
Turpentine, steam dist., drums	gal.	.80	.83
Waxes			
Antisol	lb.	.22½	.23¼
Beeswax, white [a]	lb.	.58	—
Carnauba, yellow [a]	lb.	.83¼	—
Ceresin, white, dom.	lb.	.13½	.15
Montan, dom.	lb.	.30	.35
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼	—
Refined, 120/122	lb.	.05¼	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	2.08
Gel	lb.	.52	.54
Hipar	lb.	.61	.63
Powder	lb.	.40	.42
Resin	lb.	.43	.45
Resin D	lb.	.40	.42
White	lb.	1.23	1.23
Albasan	lb.	.69	.74
Antox	lb.	.54	.56
B-L-E	lb.	.40	.49
Flectol H	lb.	.40	.47
Neozone A, C, D, E	lb.	.40	.63
Oxynone	lb.	.77	.90
Retardex	lb.	.44½	.47¾
Santoflex B	lb.	.40	.47
Santoflex BX	lb.	.54	.61
Santovar O	lb.	1.15	1.40
S.C.R.	lb.	.32	.34
Stabilite	lb.	.48	.50
Stabilite Alba	lb.	.69	.74
VGB	lb.	.43	.52

EXTENDERS

Naftolen R-100	lb.	.10	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Areskleno	lb.	.35	.50
Cocoa Soapstock	lb.	.06	.08
Colite	gal.	.90	1.15
Dipex	lb.	.06	.08
Glycerized Liquid Lubricant	gal.	—	1.35
Lubrex	lb.	.25	.30
Mineralite	ton	—	30.00
Sericite	ton	65.00	75.00
Soap Tree Bark, cut, sifted	lb.	.06	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25	—
Amberex Type B	lb.	.18¼	—
Black	lb.	.08½	.13
White	lb.	.09	.15
Brown	lb.	.10	.14
Neophax A	lb.	.16½	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08	.12
Sulfur Chloride, yellow (drs.)	lb.	.03	.08½
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	—
Commercial (bags)	cwt.	2.20	—
Tellov	lb.	1.75	—
Vandex	lb.	1.75	—
Vultac No. 1	lb.	.38	.45
Vultac No. 2	lb.	.38	.45
Vultac No. 3	lb.	.42	.49

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HELP WANTED

CHEMIST, assistant, young, some rubber, synthetic rubber and plastics experience for research and development work. Good opportunity. Metropolitan New York City area. Complete resume. Address Box 2028, RUBBER AGE.

Chemist with some compounding experience on soles and heels. Permanent position with large nationally known company. Outstanding opportunities for advancement. State age, education, experience, including previous and present employment, and starting salary desired. Address Box 2034, RUBBER AGE.

TIRE AND TUBE DEVELOPMENT AND CONSTRUCTION ENGINEERS—Excellent opportunity in progressive Eastern company. Unlimited opportunity for advancement. Salary commensurate with ability. Address Box 2041, RUBBER AGE.

RUBBER CHEMIST wanted with experience in compounding rubber and synthetic rubber for electric wires and cable. Well-known eastern manufacturer, good working conditions, modern laboratory. Excellent opportunity for man with real ability. Salary commensurate with experience. Address Box 2045, RUBBER AGE.

SUPERINTENDENT for nationally known sole and heel manufacturing company. Unusual opportunity for right man. State age, education, where employed during past ten years and where employed at present, also starting salary desired. Address Box 2035, RUBBER AGE.

AAA1 PRODUCTION MAN

Experienced in all phases of the manufacture of molded mechanical and extruded rubber goods. Also qualified to organize and direct production departments. Excellent opportunity in a mid-west rubber company, with over 1,000 employees. Address Box 2038, RUBBER AGE.

TIRE CURING FOREMAN—Must have experience and capability in supervising tire production. Permanent position with attractive salary for man with resourcefulness and ability. Eastern concern. Specify all qualifications first letter. Address Box 2042, RUBBER AGE.

PRODUCTION FOREMEN—Men thoroughly experienced in either curing, milling and calendering, or tire building operations for supervision in medium sized plant engaged in manufacture of tires and mechanical rubber goods. Address Box 2046, RUBBER AGE.

WANTED: Young man with technical education and latex experience for laboratory work in New England. Address Box 2049, RUBBER AGE.

RUBBER MILLMAN. Experience in milling rubber and synthetic rubbers for mechanical goods. Steady work, good working conditions. Small plant located 70 miles northwest of Chicago. Write giving past experience and salary desired. Address Box 2050, RUBBER AGE.

RUBBER MILL ROOM FOREMAN wanted by medium sized rubber plant in New York area. One capable of taking complete charge. Molding experience helpful. Good chance for advancement. Address Box 2057, RUBBER AGE.

HELP WANTED (Continued)

CHEMIST, who has had experience compounding rubber for sheet goods and proofed fabrics. Finished products are baby pants, crib sheets, raincoats, protective clothing, etc. Excellent opportunity in modern laboratory especially for a man with ideas. This firm has best possible employee relations and takes pride in letting its personnel develop to the fullest degree. Plant employs 700 and is located in city of 15,000. Excellent living conditions. Write giving experience. Address Box 2052, RUBBER AGE.

TIRE FINISHING SUPERVISOR—Opening for man with experience in supervising duties connected with cured tire final finishing. Position offers excellent opportunity for advancement. All replies confidential. Address Box 2043, RUBBER AGE.

ENGINEER—RUBBER MANUFACTURING PLANT. Must be fully experienced installation, maintenance and operation of mills, Banbury mixer, tubers, presses, etc. Also supervise machine shop for making molds and plant maintenance. In reply state age, experience and salary requirements. Plant located in eastern Pennsylvania. Addrss Box 2056, RUBBER AGE.

WANTED

Chemist, young, with some experience in rubber compounding, testing and factory control for New England factory. Give details as to age, experience and starting salary. Address Box 2058, RUBBER AGE.

MASTER MECHANIC

Reclaimed Rubber Manufacturer has opportunity for first class man having thorough knowledge and experience in the installation and maintenance of all types of rubber machinery. State age, experience, salary. Address Box 2059, RUBBER AGE.

MASTER MECHANIC WANTED: Plastics and Rubber molding concern—vicinity Trenton, N. J.—established 50 years, has opening for master mechanic with experience in rubber and/or plastics. In charge of force of 40 to 50 men in various service departments; machine shop, electrical, boiler plant, etc. And responsible for maintenance of plant and equipment. Expanding business offers excellent future. Write fully, giving age, experience and salary expected. Address Box 2060, RUBBER AGE.

RUBBER FOREMAN to supervise compounding, milling, extruding and molding operations in small factory, N. Y. vicinity. Excellent opportunity. Write full particulars. Address Box 2062, RUBBER AGE.

TUBE ROOM SUPERINTENDENT OR FOREMAN—Must be capable of supervising all tube room operations. Opening offers unlimited opportunity for man of experience and capability. Progressive Eastern concern. All replies strictly confidential. Address Box 2044, RUBBER AGE.

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Address Box 2054, RUBBER AGE

POSITIONS WANTED

MEDIUM OR SMALL COMPANY—Top production—technical position desired by chemical engineer, age 28. Several years' experience with large tire company. Exceptional knowledge of all latest processing techniques, natural and synthetic rubber. Also compounding experience. Salary $6,200. East or Midwest. Address Box 2023, RUBBER AGE.

RUBBER CHEMIST: M.S. 1932. Experienced in physical and chemical analysis of rubber compounds, correction of defective batches, research and development on natural and synthetic rubber. Familiar with all laboratory work and compounding. Has supervised laboratory. Desires laboratory and factory position. Address THE CHEMIST, 40 Baldwin Street, Youngstown, Ohio.

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TERMINATIONS? CANCELLATIONS? WANTED: Chemicals, Colors, Pigments, Resins, Solvents, Oils, Waxes, Lacquers. Other Materials, Supplies, Equipment, etc. Address Box 1825, RUBBER AGE.

WORKING PARTNER WANTED for Pacific Coast rubber goods manufacturing plant. Must be thoroughly familiar with latest production methods. $15,000 will purchase half interest. Remarkable opportunity for right party. Address Box 2004, RUBBER AGE.

COMPLETELY EQUIPPED RUBBERIZING PLANT FOR SALE, located within 100 mile radius of Chicago. Ideal town for labor conditions. Plant can be rented or purchased. Equipment consists of mixing mills, calender, spreaders, doubler, churns, pony mixers, brushing machines, complete power plant, etc. Address Box 2040, RUBBER AGE.

CHEMICAL MANUFACTURER OR FACILITIES wanted for production of several tons daily of GR-S masterbatch from latex and non-black fillers. Requires mixing and precipitation tanks. Cake easily filtered and dried. Address Box 2051, RUBBER AGE.

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They prefer to represent a few mills and plants and satisfy them. They consistently foster the long-time relations of their customers and mills.

Accounts need not be large—their quality being most important.

They are prepared to undertake the distribution of the entire output of a manufacturer, or of any one product that may not fit the regular sales facilities of a manufacturer.

They prefer raw materials, and in fabricated materials, particularly heavier stampings—molded rubber—automobile body textiles including carpeting.

Address Box 2055, RUBBER AGE

EQUIPMENT WANTED & FOR SALE

MOLDS WANTED: Approximately ⅛" cavity x 28", 31" and 36" square inside; plain surface. Will rent or buy. Address Box 2033, RUBBER AGE.

WANTED: 24" x 60" two roll mill. Ratio 1½-1. Also 6" x 12" laboratory mill. Address Box 2039, RUBBER AGE.

WANTED: One #3 Royle tubing machine in good operating condition, with or without gear reduction drive and motor. Address ASSOCIATED RUBBER PRODUCTS COMPANY, Quakertown, Pennsylvania.

WANTED—Hydraulic Presses, with pumps and accumulators, Banbury Mixer, Mills, Calender, Tubers, any condition. Address Box 2061, RUBBER AGE.

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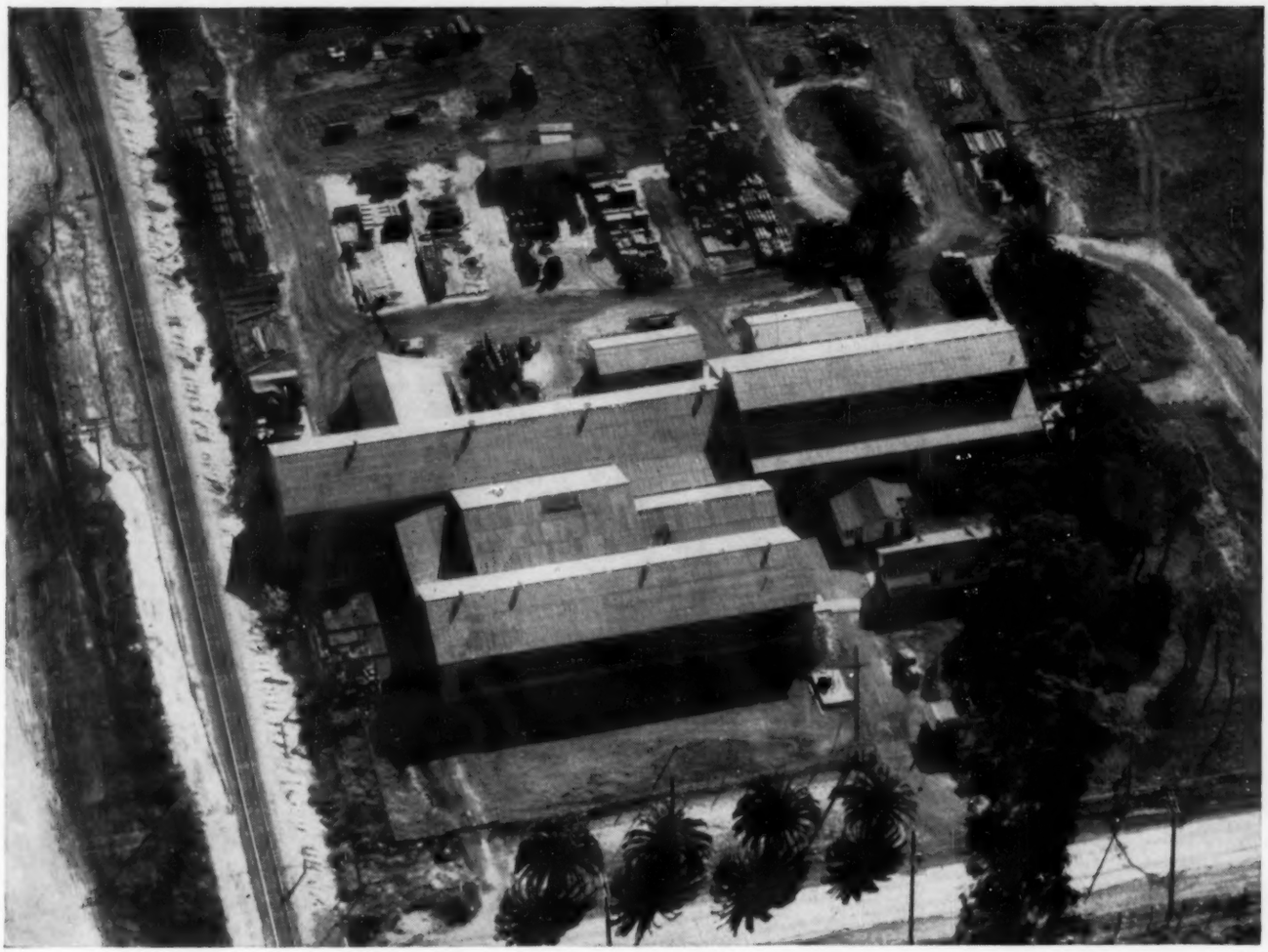

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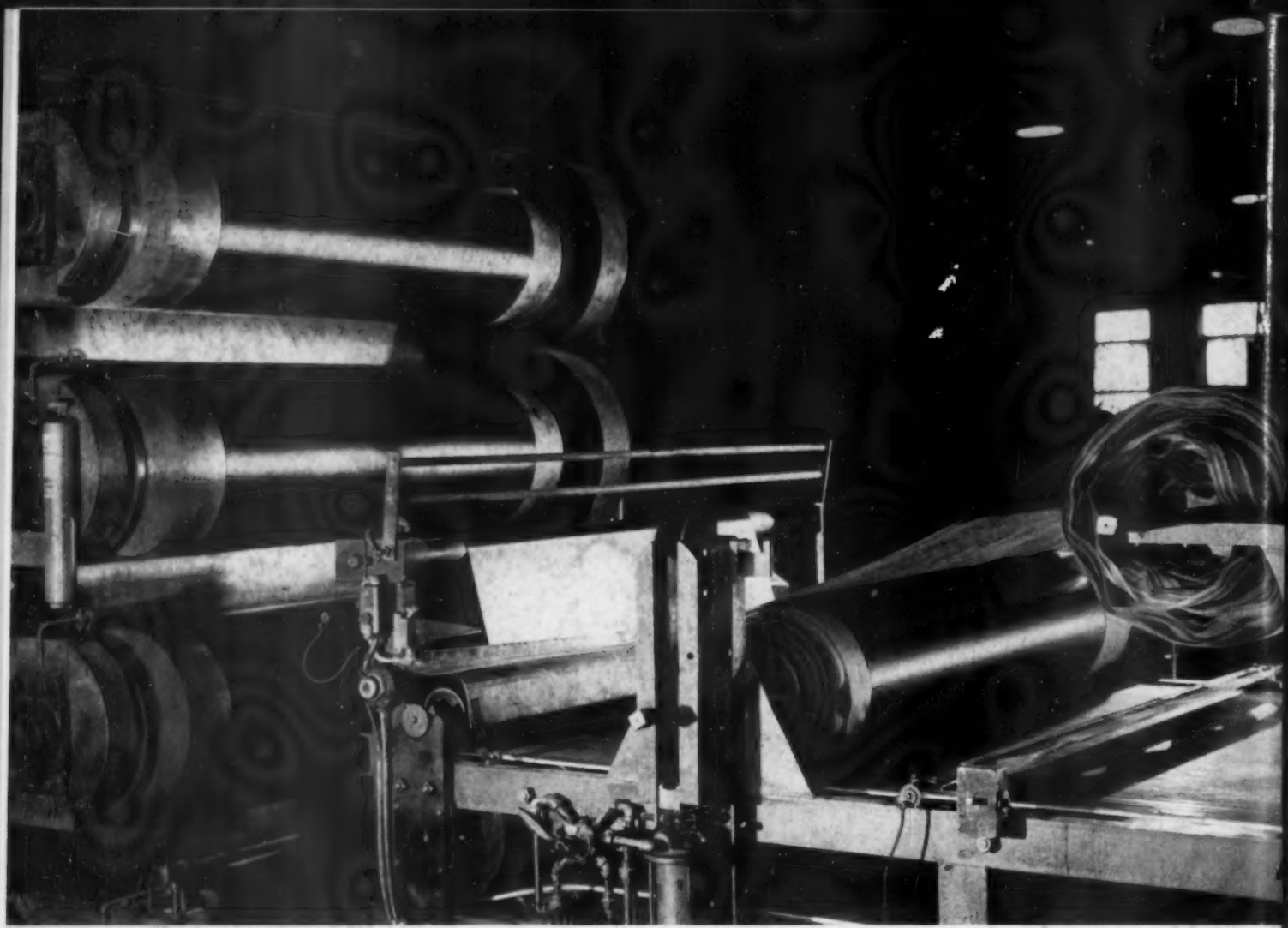

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